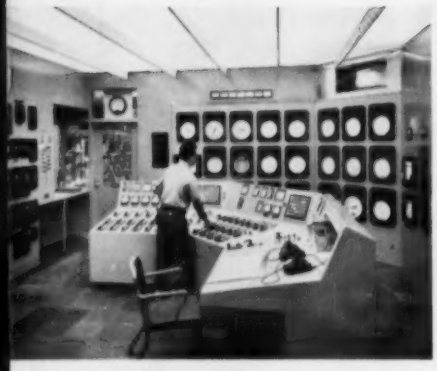
ELECTRICAL WEST

May 1955
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.

Economies with Machines 59



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Look at the appealing features of an all-electric kitchen! Our guess is that any homemaker would find it difficult to make a "most wanted" selection from among them. This is why the current series of Edison advertisements lists *all* the features, then points out that there's no need to choose. "You get them *all* . . . in an all-electric kitchen" is the key.

As a special note to the electrical appliance dealers of Central and Southern California, we might emphasize that the list of desirable features makes a list of strong *selling points*, too. You get them *all* . . . in Edison advertising!

Edison

SOUTHERN CALIFORNIA EDISON COMPANY

SMOOT-HOLMAN EDUCATOR

the TOP QUALITY *ring fixture*

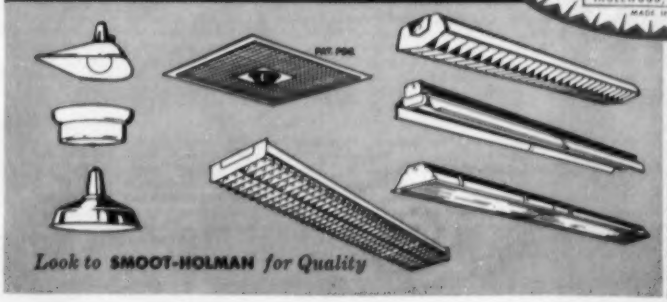
easier on the eyes

easier on the budget, too!

Here is the ultimate in high seeing efficiency, low brightness illumination created by Smoot-Holman research engineers. The Educator's quality features mean important savings for schools, offices, or stores. For example, an ingenious canopy plate, mountable in minutes means rock-bottom installation charges. And rolled concentric rings assure low cost, easy maintenance... can't collect dust or insects. A low heat porcelain enameled socket cover and correct neck shielding which eliminates glare and creates an even ceiling pattern are plus values in beauty and seeing efficiency... For that next important lighting job, specify Smoot-Holman.

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

Sales Offices in Most Principal Cities.
San Francisco • Branch Office & Warehouse



Look to **SMOOT-HOLMAN** *for Quality*

Send coupon for full information

SMOOT-HOLMAN COMPANY

P. O. BOX 398 • DEPT. 102 • INGLEWOOD, CALIFORNIA

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☐ EDUCATOR ☐ SCHOOL OR INSTITUTIONAL
☐ COMMERCIAL ☐ INDUSTRIAL ☐ FLOOD

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ELECTRICAL WEST

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
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Next Month

In June Electrical West will have its 22nd Annual Convention-In-Print. There will be something on the program for all in the industry. The presidents of the three electrical associations in the West will tell of developments in their areas. One feature will be a comprehensive review of the power development program in the Northwest. Another will deal with codes. Also on the program will be electronic data processing, a merchandising story and one for electrical contractors.

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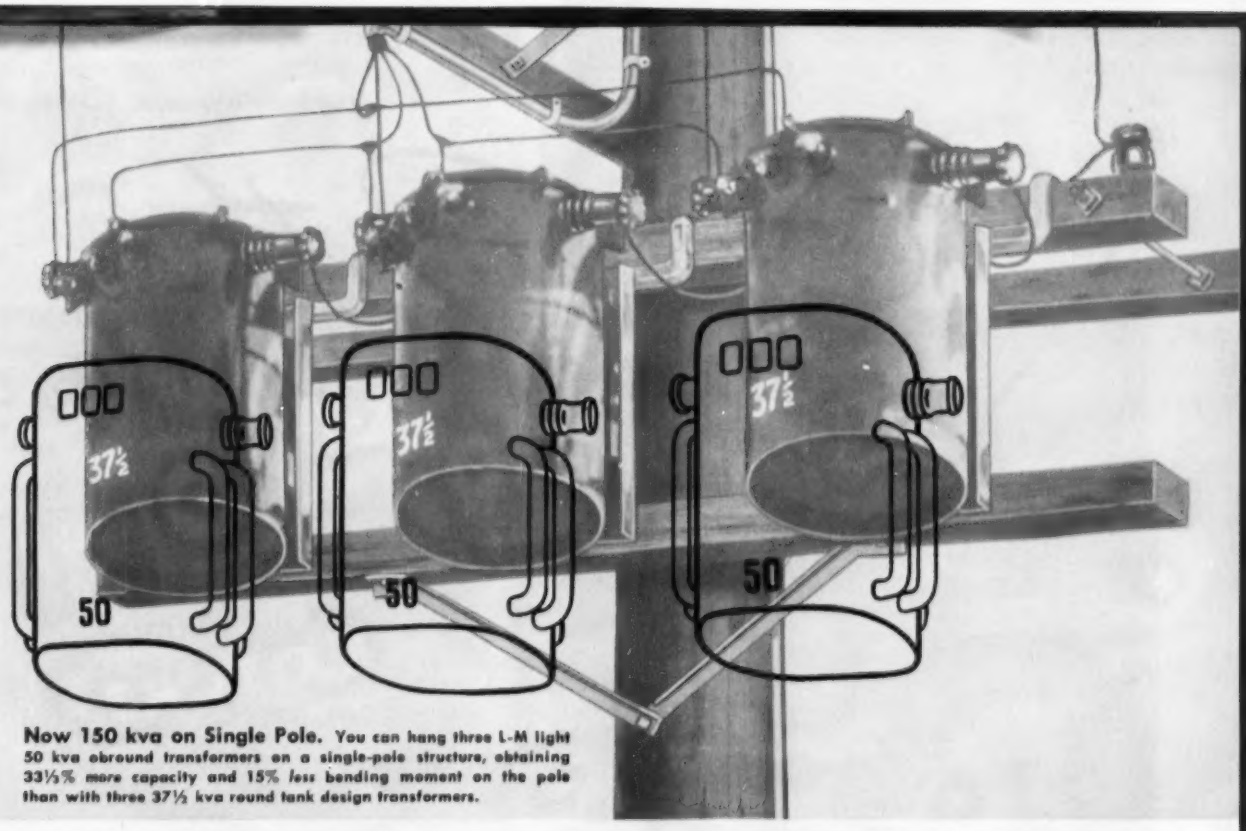


Now 150 kva on Single Pole. You can hang three L-M light 50 kva obround transformers on a single-pole structure, obtaining 33⅓% *more* capacity and 15% *less* bending moment on the pole than with three 37½ kva round tank design transformers.

How L-M Obround Design Provides Additional Capacity On Structures

New obround tank design is smaller, lighter, has shorter moment arm, retaining all outstanding Round-Wound® performance characteristics.

By **ALVIN B. COYLE**
Manager
Transformer Sales
Line Material Company

Now you can hang transformers of larger capacity on a pole structure with L-M's lighter, smaller obround transformer tank design. The additional capacity is obtained without changing outstanding performance characteristics of L-M's Round-Wound design.

Less Weight

The obround design provides a smaller tank with less transformer oil, resulting in a lighter, easier-to-handle transformer. Cooling tubes are installed where necessary to provide the cooling surface for maintaining the same low hot-spot and top oil temperature-performance characteristics found in all other L-M transformers. In addition, the transformer's repetitive overload capacity is improved as the result of the faster transfer of heat from the coils to the cooling air.

Shorter Moment Arm

L-M's new obround design brings the center of gravity closer to the pole, which reduces the moment arm distance from the pole. The combination of lighter weight and less moment arm distance substantially decreases the total bending moment on the pole and crossarms, and thus greatly increases the potential capacity of all your transformer structures.

You can take advantage of savings such as these:

Larger transformers can be hung closer to the top of the pole, eliminating the need for a higher pole and additional spacing.

Single-pole, three-phase transformer structures can now serve more load with the additional transformer capacity available. New 50 kva obround transformers have less bending moment on the pole and on crossarms than previous 37½ kva round tank design. Here L-M's light obround transformers may eliminate the need for costly two-pole structures.

Pole-Mounted 167 kva Transformers

L-M's light-weight 167 kva transformer can be pole-mounted; provides a full 167 kva of capacity on a single-pole structure. And it, too, provides L-M's well-known overload capacity.

To serve three-phase loads you can hang three L-M light 167 kva transformers or 500 kva on a two-pole structure, eliminate expensive platforms, ground pads, or vaults in many instances, and make further use of existing facilities.

L-M's light, obround design transformers are available in single-phase 5 kva through 167 kva in each standard distribution voltage class.

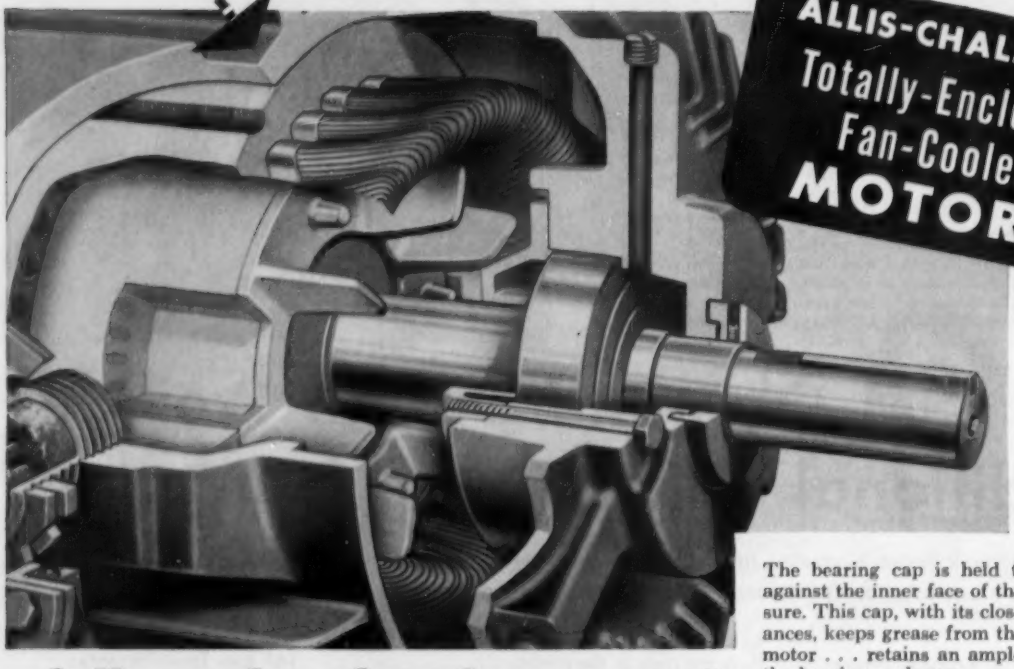
Get Details On Lighter-Weight Obround Transformers

Ask the L-M Field Engineer for application information, weights and dimensions on L-M obround transformers and the exclusive Round-Wound design. Or write Mr. Coyle at Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

219-A

LINE MATERIAL *Transformers*

Get Both
bearing features



fully enclosed and protected

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

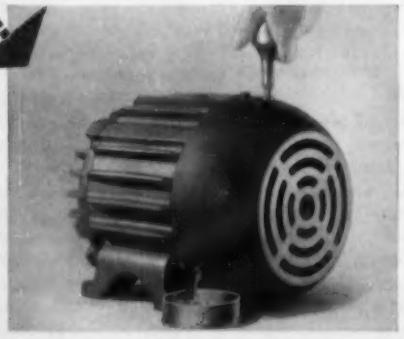
At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

. . . yet easy to grease

You can lubricate the bearings without dismantling the motor. Pipe-tapped holes in the bearing housings at three points provide both means for inserting new grease and a means of flushing out old grease.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

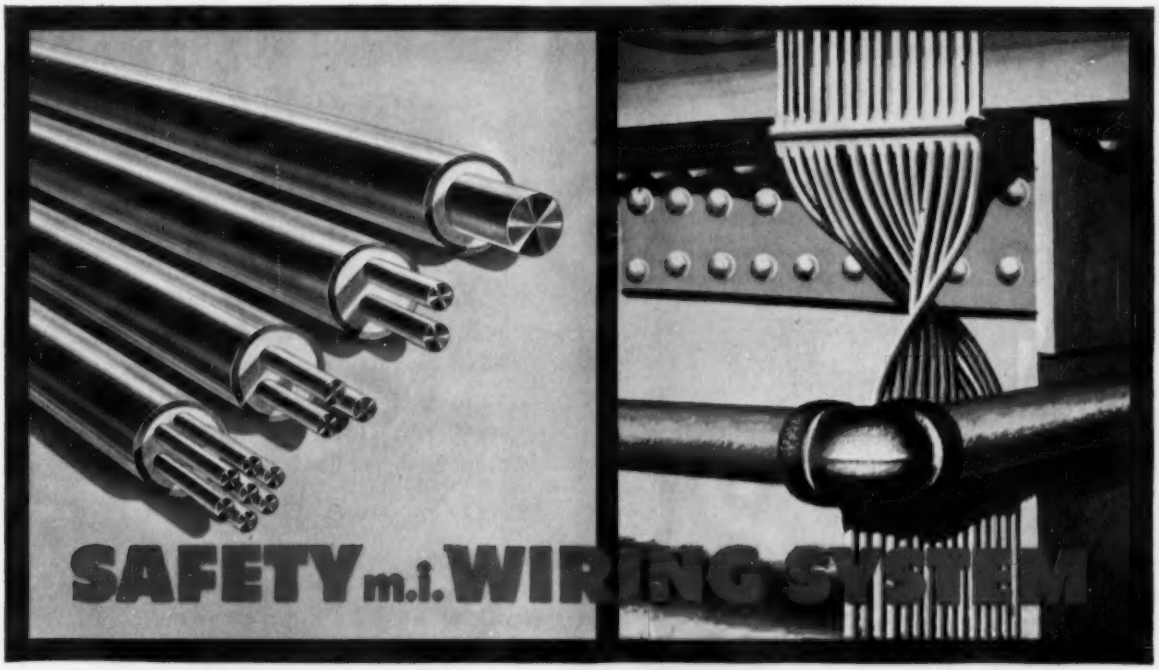
A-4609



ALLIS-CHALMERS

GENERAL CABLE

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE



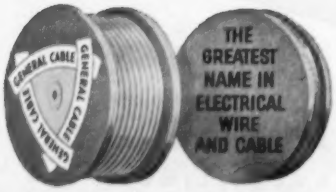
A dramatic new advance in electrical wiring for all applications up to 600 volts and wherever heat, vapors, moisture and aging are problems. Safety m.i. Wiring is ideal for low voltage, lighting, power, control, machine tool and equipment uses.

The mineral insulation of Safety m.i. Wiring is physically stable up to 2800° Centigrade . . . will not burn, deteriorate, support combustion, or convey flame . . . provides extra safety in boiler rooms, around steam pipes, boiler stacks and other "hot spots." Simple fittings seal both ends of wiring runs . . . no possible entrance for moisture.

Underwriters' Approved Safety (Type m.i.) Wiring Systems offers lower installation and maintenance costs. Acts as its own conduit . . . can be installed in one operation with standard switch and junction boxes. Easily shaped on the job, Safety m.i. can be fastened with standard clamps or straps . . . stays put permanently!

Save time and money! Get a neater job! Simplify planning! Ask your General Cable Representative for all the facts about Safety m.i. Wiring Systems. Remember, too, General Cable is the *only* manufacturer who can supply *all* your wire and cable needs!

GENERAL CABLE
CORPORATION



BARE, WEATHERPROOF, INSULATED WIRES and CABLES FOR EVERY ELECTRICAL PURPOSE

GENERAL CABLE CORPORATION
Executive Offices: 420 Lexington Ave., New York 17, N. Y.

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How to meet utility load growth the easy way

By installing Electro-Mobile Power right at any new point of need, you will—

1. Escape new high-line cost entirely.
2. Postpone—or avoid—expensive additional generating station capacity.
3. Be paying no fixed charges for surplus capacity.
4. Have minimum line loss.

Rail car, truck trailer and portable units—350 to 1,000 kw.

Write for simple formula explaining investment advantages of Electro-Mobile Power to:

ELECTRO-MOTIVE DIVISION

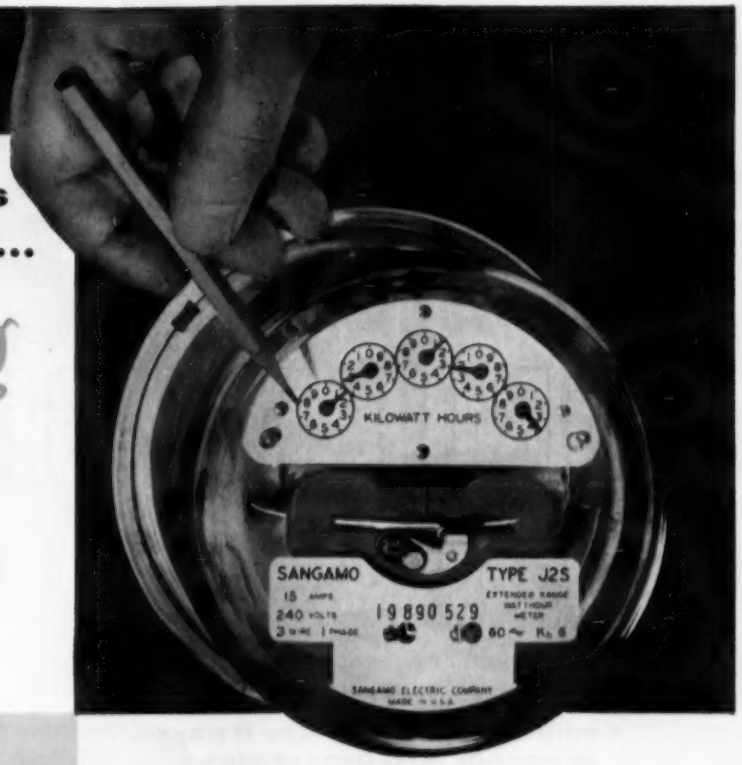
GENERAL MOTORS • LA GRANGE, ILLINOIS

Sold and serviced directly through a manufacturer's organization. Electro-Motive Division offices located in: New York City, Chicago, Jacksonville, St. Louis and San Francisco.

In Canada: GENERAL MOTORS DIESEL, LTD., London, Ontario

for the loads of the future...

something NEW has been added



to the Sangamo J2—the meter of the future!

If you are adding to your customers' kwh consumption through load-building programs . . . through the promotion of adequate wiring . . . and if you are concerned about meter reading costs, you may be interested to know that *something new has been added to the Sangamo J2 Watthour Meter.*

The "something new" is an extra circle the same size as on 4-circle registers. This new 5-circle register practically guarantees *no register turn-over on big loads—even with extended reading periods.* And it's optional at no extra cost.

If you would like to see for yourself how efficiently designed this new register is, we'll gladly send you a standard production Sangamo 5-circle register. Just fill out the coupon below and mail it today.

the FIRST watthour meter with straight line accuracy up to 100 amperes!

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS
Please send me a new standard production Sangamo 5-circle register

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COMPANY_____

TITLE_____

CITY_____ ZONE____ STATE_____

JM55-4

Look at the DIFFERENCE DROP FORGING makes

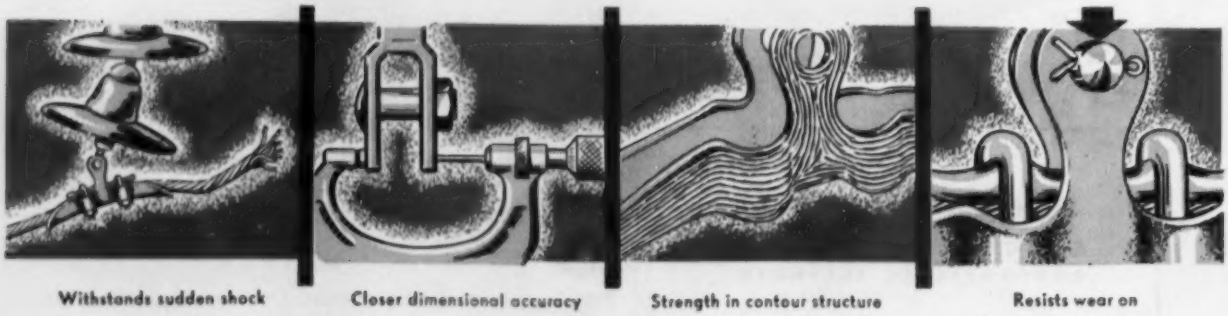
Comparison shows why it pays to specify BTC Drop-Forged Hi-Line Hardware

FORGING WAS FIRST USED by prehistoric man to shape metals to usefulness. Today, it's employed not only to shape metal but to impart strength, lightweight and uniformity of structure as well. The repeated blows of the forging hammer, press or upsetting machine refine the grain structure, toughen the metal.

Brewer-Titchener was first to introduce a standardized line of drop-forged high voltage transmission line hardware. Today, BTC offers a complete line of drop-forged parts and assemblies for your use.

Closed die forging gives BTC Hi-Line Hardware greater strength and soundness, in addition to finer finish and closer dimensional fidelity than can be obtained by other processes. Through forging, BTC Hardware acquires a uniform, fibrous, close-grained structure . . . with the grain flow advantageously following the contour of the part. This results in superior mechanical strength plus the ability to withstand severe loading, sudden shock and frequent reversal of stress as well as to prevent excessive wear on flexibly connected load-bearing surfaces.

Forging permits BTC to design parts and assemblies with lighter sections without sacrificing desired strength. BTC Forged Steel Hardware, for example, may be heat-treated to increase strength up to 50% without adding undesirable mass and weight. All BTC Forged Aluminum Alloy Conductor Clamp Parts are fully heat-treated. The more-than-adequate catalogued strength ratings of BTC Hardware are conservative and are exceeded in actual tests.



Withstands sudden shock | Closer dimensional accuracy | Strength in contour structure | Resists wear on load-bearing surfaces

CAST CLAMP
Metal has no fibrous structure. Lower yield and tensile strengths . . . heavier sections necessary in critical areas . . . undesirable extra weight.

BTC FORGED CLAMP
Fibrous grain structure of metal conforms with shape of clamp . . . making clamp stronger, tougher, while permitting lighter-weight design.

NEW BTC CATALOG!
Latest, revised edition of BTC Hi-Line Hardware Catalog now off the press! Write for your **free** copy.

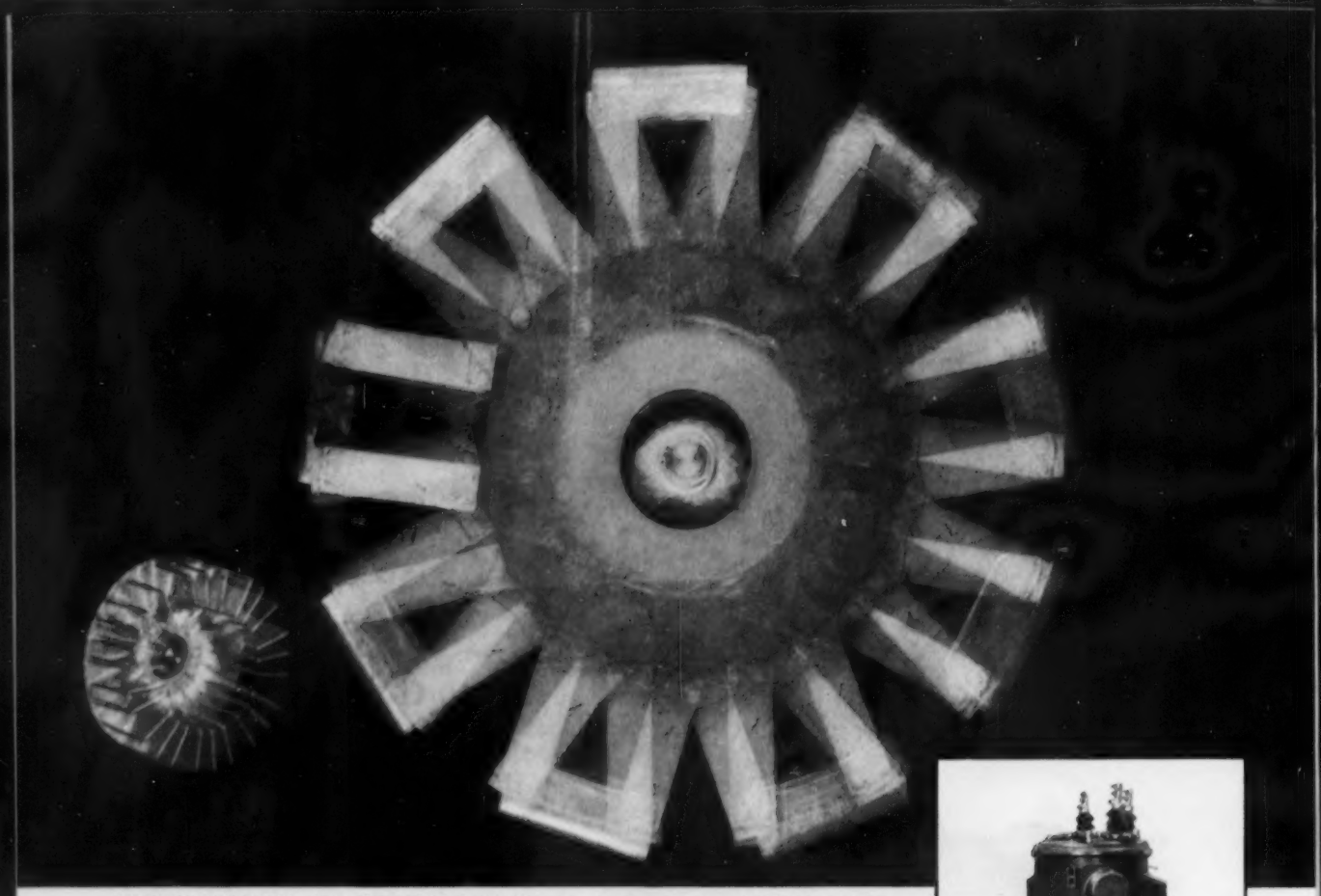
BTC

Specify

DROP-FORGED Hi-Line Hardware

. . From Your Insulator Manufacturer

THE BREWER-TITCHENER CORPORATION, Cortland, N. Y.



STROBOSCOPIC PHOTO of spinning paddle wheel (left) and rotating tap changer on G-E ML32 regulator.

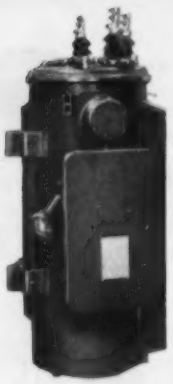
DOES YOUR SUPPLEMENTARY REGULATOR HAVE

"Bounce-free" switch action for lower maintenance cost

Here's *another* important General Electric voltage regulator feature that appreciably lengthens contact life—reduces maintenance expense. The secret: "Bounce-free" Opti-Life switching, which makes the contacts glide into the next tap position.

See that little paddle wheel in the photo, at the left of the switch? It acts as a speed-controller to minimize erosion as the contacts part. You get an optimum speed . . . not too fast, not too slow. Also, entry into the next position is smooth, positive, with no life-reducing bounce. This little Opti-Life impeller has helped extend contact life to over *five times what it was ten years ago!* It's an exclusive feature of G.E.'s ML32 single-phase step voltage regulator for supplementary service.

12 more features, many just introduced into the 1955 ML32 feeder voltage regulators, mean greater accuracy, longer life, superior service. They add up to the most advanced supplementary regulator available today. General Electric Company, Schenectady 5, New York. 423-6



ONLY THE ML32 GIVES YOU ALL THESE FEATURES

Greater Accuracy

Class 1 Control Accuracy
Control Dial Locking
Control Test Rheostat
Rheostats For LDC Adjustments

Longer Life

Opti-Life Tap Switching
One-Piece Cover Band
Super Melaglyp Paint
Nitrile Rubber Gaskets
Electrostatic Shielding

Superior Service

Flat Upper VRR Contacts
Up To 120-Sec. Time Delay
Handy Meter Shelf
Internal By-Pass Protection

Progress Is Our Most Important Product

GENERAL ELECTRIC

To All Our Distributor Friends . . .

PHELPS DODGE COPPER PRODUCTS CORPORATION

cordially invites you to visit
our Conference Booth 102-A
during the convention of the
NATIONAL ASSOCIATION
OF ELECTRICAL DISTRIBUTORS
Conrad Hilton Hotel, Chicago, Illinois
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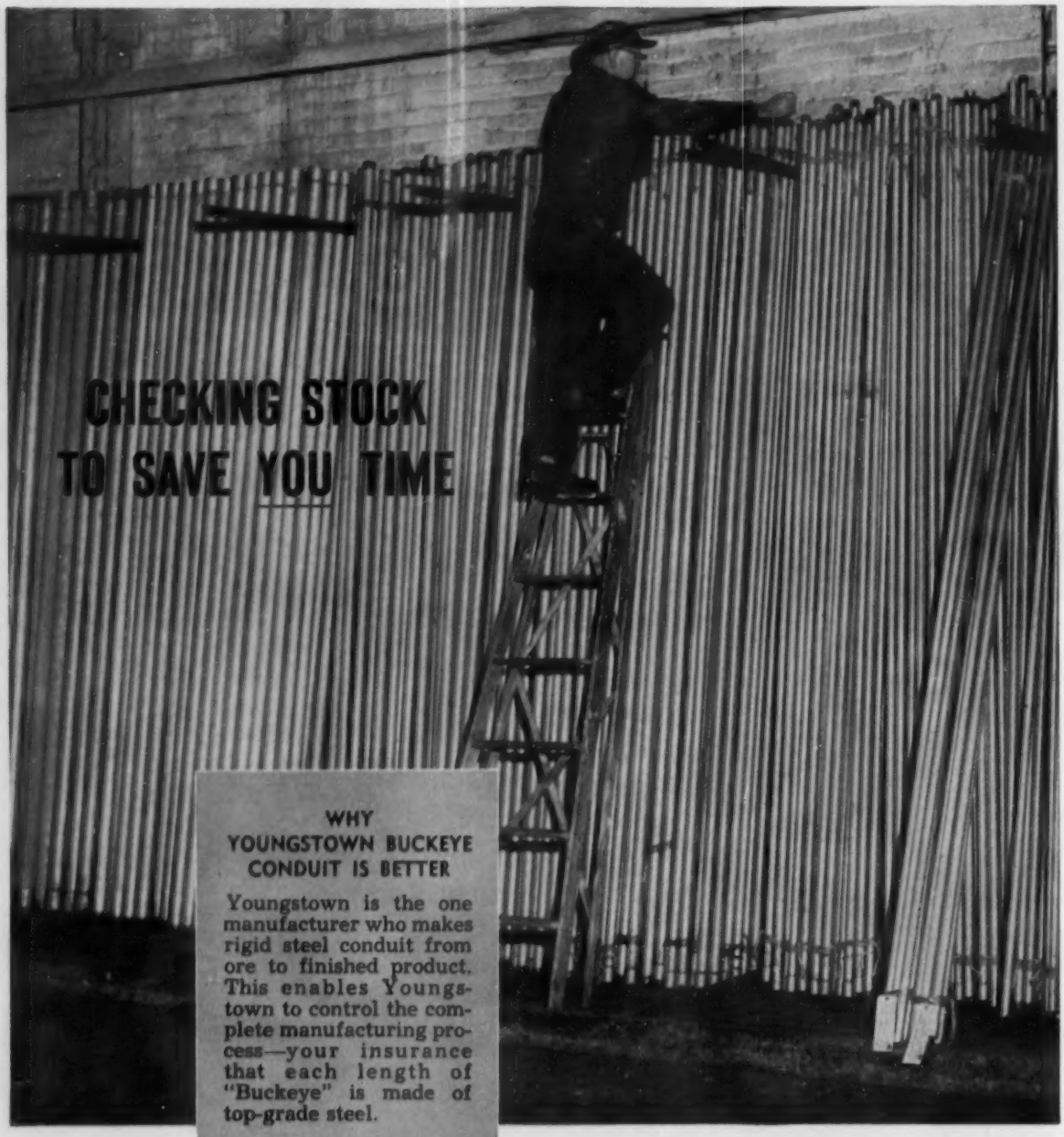

WHY YOUNGSTOWN BUCKEYE CONDUIT IS BETTER

Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.

Youngstown

BUCKEYE QUALITY YOUNGSTOWN SERVICE **CONDUIT**

●You can be sure of prompt delivery of Buckeye rigid steel conduit, because your Youngstown Distributor keeps ample supplies on hand and checks his stock regularly. His careful planning helps you keep jobs on schedule and meet emergency needs. Your Youngstown Distributor is as handy to you as your 'phone. Rely upon him whenever you need quick service on delivery of good steel conduit.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Make Present Wire

Carry twice the load!

Here's How:

Most lines have extra copper to take care of voltage drop. You can use it to carry more load if you let Allis-Chalmers distribution regulators control voltage automatically.

When load is doubled, voltage drop doubles, too. That's where the ± 10% range of Allis-Chalmers distribution regulators comes in. For example, on a line with 10% voltage drop, doubling the load makes voltage drop 20%. With an A-C voltage regulator you bring the voltage drop back to 10%.

Low-cost Allis-Chalmers distribution regulators mean small capital expenditure. And close voltage control provides higher revenue, few voltage complaints.

A-C distribution regulators are ideal for service like this. They provide quality regulation at low cost . . . are easy to install, simple to operate. Get complete facts from your A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4631

ALLIS-CHALMERS A-C ALLIS CHALMERS

Portrait by Fabian Bachrach

Bell Aircraft has 13,000 payroll savers

"From every point of view, the purchase of U. S. Savings Bonds contributes to the soundness of our economy and to the individual security of our citizens. I am proud that at Bell Aircraft our employees are helping to strengthen the national economy and their own future security through the Payroll Savings Plan.

"In a recent campaign Bell employees achieved a record of nearly 99% participation in the Payroll Savings Plan, bringing to 13,000 the total number of our employees who are saving systematically through the regular purchase of Savings Bonds."

LARRY BELL, *President Bell Aircraft Corporation*

If your company does not have the Payroll Savings Plan, or if you have the Plan and employee participation is less than 50%—get in touch with Savings Bond Division, U. S. Treasury Department, Washington, D. C. Your State Director, U. S. Treasury Department, will be glad to help you install a plan or show you how easy it is to build employee participation in your present plan.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

ELECTRICAL WEST

PARANITE PARAUSE®

(TYPE RR)

● Paranite Parause cable buries direct in earth to provide permanent installation from power line to meter, and for connecting buildings. CAA approved under specification L824. Can also be used in conduit or ducts. Conductors protected with heat and moisture-resistant rubber insulation. Outer Neoprene jacket gives added protection against moisture, elements in the soil, and acts as a cushion against injury to the current carrying conductors. Single, two and three conductors. *Write for Catalog!*

PARANITE WIRE AND CABLE
DIVISION ESSEX WIRE CORPORATION
Fort Wayne 6, Indiana
MANUFACTURING PLANTS: Birmingham, Ala.; Anaheim, Calif.; Jonesboro, Ind.; Marion, Ind.

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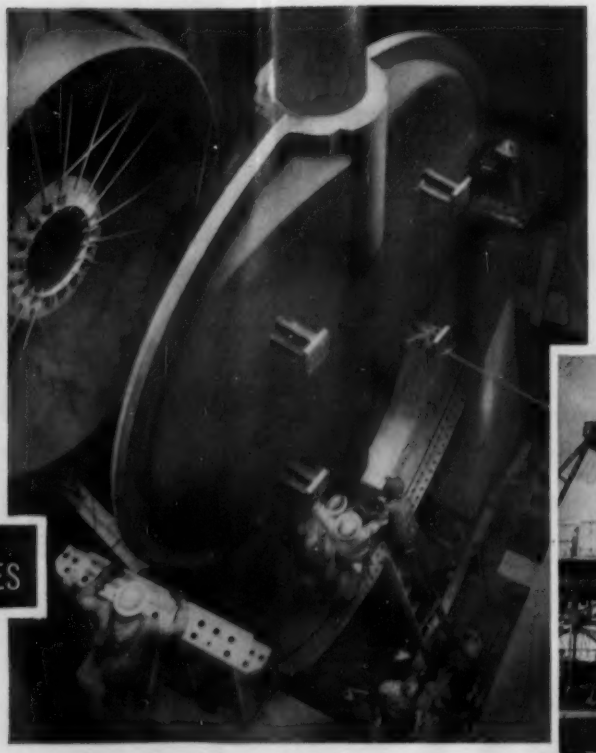

An 18' butterfly valve disc is shown here during installation at Blakely Mountain in Arkansas. Note the streamlining of the welded disc.

Photos – Vicksburg District, Corps of Engineers

SMS
BUTTERFLY VALVES

SMS VALVE SEALS CUT LEAKAGE TO MINIMUM

SMS Butterfly Valve seals cut leakage to a minimum. Disc seals are adjustable from either inside or outside, whichever is specified. Specially-developed SMS trunnion seals are essentially drop-tight.

With inside adjustment, the disc may be seated directly on the plate steel housing, as at Blakely Mountain, illustrated above, and as at Fort Peck, Montana. Here a 16 ft. dia. valve, recently tested after 14 years of service, had *less than ½ gpm leakage.*

SMS welded discs and housings assure greater freedom from the material defects of castings and permit more economical construction. The photo illustrates the streamlining possible with welded steel plate construction. This holds head losses and turbulence to a minimum.

SMS has designed and built butterfly valves in diameters from 3 inches to 18 feet, for service with operating heads up to 750 feet. For the assurance that your hydraulic equipment will meet or exceed specifications, you can rely on over three-quarters of a century of experience that SMS offers. For full information on butterfly valves, hydraulic turbines and accessories, write S. Morgan Smith Company, York, Pennsylvania.

Hydraulic Turbines
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HYDRODYNAMICS

Rotovalves
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S. MORGAN SMITH CO.

AFFILIATE: S. MORGAN SMITH, CANADA, LIMITED, TORONTO

another TRANSFORMER DEVELOPMENT from General Electric

Unretouched photograph shows paper-and-cotton insulated wire (left) and the new Formex wire (right)

Tough, thin-skinned FORMEX* wire

now replacing paper and cotton in G-E transformers

Your General Electric transformers will be more reliable—yet smaller and easier to handle—because of a new use for a very remarkable film insulation.

Round Formex wire was a sensation when it was first used on General Electric Tri/Clad* motors. For the first time it made possible insulation that was a strong, integral part of the wire—not a bulky, wrap-around covering.

Formex wire has now been successfully adapted to the *rectangular* wire used in transformers. Application is made possible by a coating method developed by G.E. By this method, the insulation is spread evenly not only on the flat surfaces of the wire, but also on the edges. Once applied, the impulse strength of Formex wire is phenomenal; three mils thickness of the film insulation has *twice* the impulse strength of six mils of ordinary paper and cotton.

Already being used in many G-E power and distribution transformers, Formex wire in combination with improved core steel makes possible reductions up to 10 percent in transformer size and weight, while actually increasing reliability. To see how Formex wire is giving you better transformers, please turn the page.

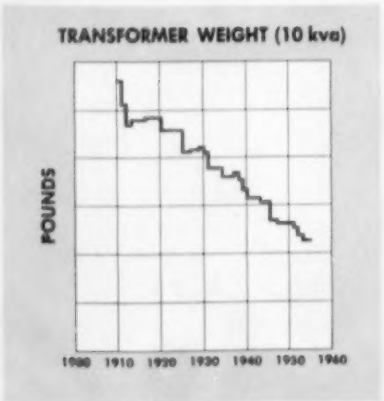
*Reg. trademark of General Electric Company

GENERAL ELECTRIC

FORMEX WIRE IN G-E POWER TRANSFORMERS MEANS SAVINGS IN INSTALLATION TIME AND EXPENSE.

Formex* wire cuts transformer weight

8 SUCCESSIVE COATS of the film insulation are applied and each is individually baked on. To assure quality, G.E. manufactures its own wire.



LIGHTER TRANSFORMERS — Since 1910, G.E.'s 10 kva model has been cut to 230 lbs. Formex wire means further reductions.

WINDING FORMEX WIRE for a distribution transformer. Notice uniform coil structure.

*Reg. trademark of General Electric Company

FORMEX WIRE HELPS MAKE G-E DISTRIBUTION TRANSFORMERS EASIER TO HANDLE.

up to 10%—yet increases reliability

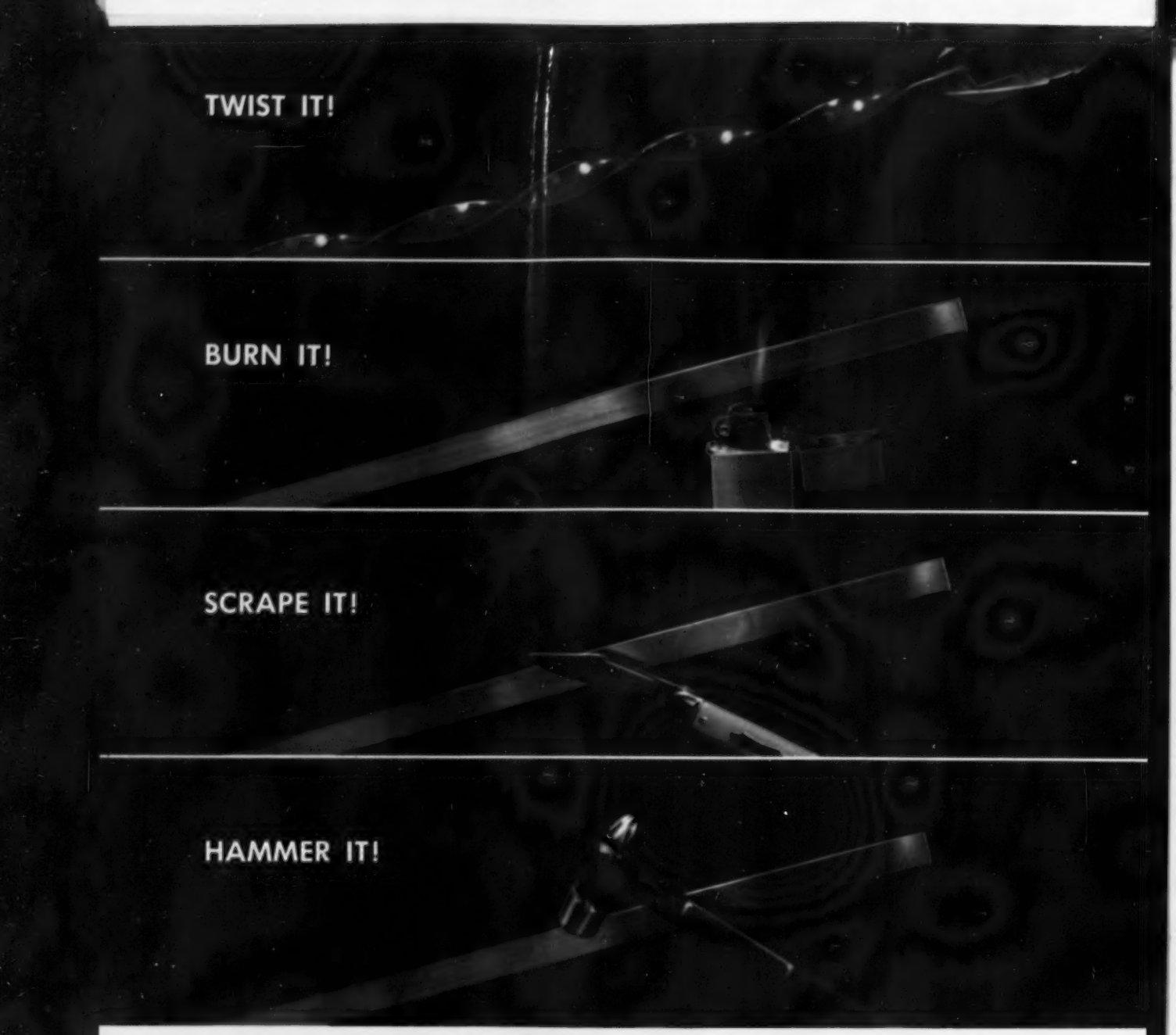
The use of Formex wire and improved core steel makes General Electric power and distribution transformers up to 10 percent smaller and lighter and therefore easier for you to handle and install. This relatively large reduction in size and weight results from the snowball effect that savings in winding space have on total size and weight. For example, the use of Formex wire helps to reduce the size of the coil structure. This in turn permits a smaller core for the same performance characteristics. To hold the core-and-coil assembly, a smaller tank and less oil are required.

Not only will your new G-E transformers be lighter and easier to handle, but they will also be more reliable because of the durability of Formex wire. Up to eight separate coats are given to each strand of wire. The resulting insulation is so rugged that you can twist a piece of the wire many times without cracking or damaging it.

Formex wire is now used in certain distribution transformer ratings 50 kva and below. In many oil-immersed power transformers it is used on windings up to 25 kv. As rapidly as facilities permit, the use of Formex wire will be extended to other ratings, in G.E's continuing program of transformer research and improvement.

Progress Is Our Most Important Product

GENERAL ELECTRIC



FORMEX has amazing strength!

LET ME TEST IT!

General Electric Co., Section 431-19
Schenectady 5, New York

I'd like to see a sample of rectangular Formex wire.
Send it to me at this address:

Name_____

Address_____

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Test it yourself! General Electric will be glad to send you a sample of the new rectangular Formex wire to test under your own conditions. Once you've tried the experiments demonstrated above, you will understand why the new Formex wire improves transformer reliability. For your sample, mail the coupon today. General Electric Co., Schenectady 5, New York.

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This forming operation at Gilro Machine & Stamping Co., Oakland, Calif., is typical of applications where it pays to select the one right steel. Beginning in the open hearth, steel from USS is made to do one specific job and do it best at lowest cost.

You can save money
USING THE ONE RIGHT STEEL!

For every job, there is *one particular steel* that best suits the need. Evaluating your requirements and interpreting them into steel is our business. Forming, drawing, stamping, rolling, bending, painting —these are all things to be considered.

And with the one right steel you get more efficient production, fewer rejects, higher quality in your finished product.

Isn't there some place in your plant where the one right steel could be saving you money today? One call to a Columbia-Geneva Technical Field Representative could be the answer to your problem.

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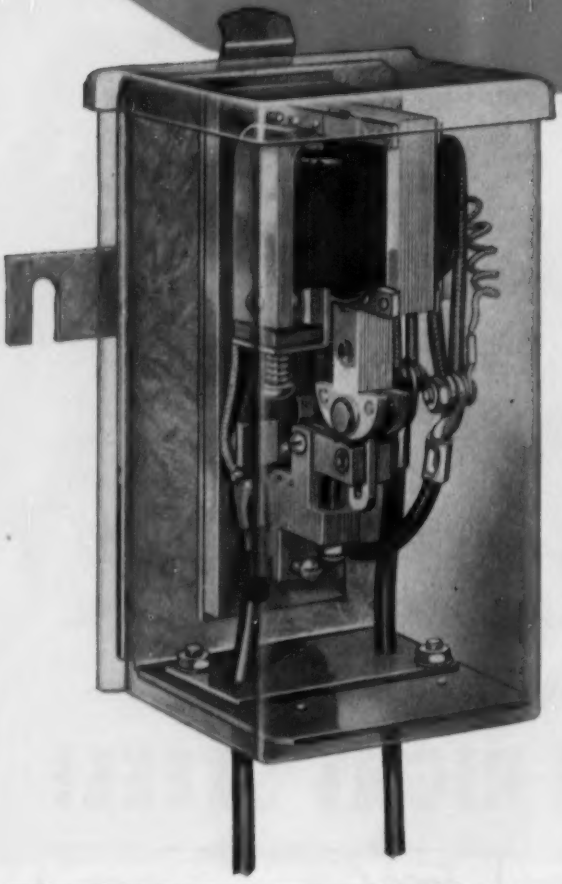
Take full advantage of banked secondaries...



Restore service Automatically with

KEARNEY

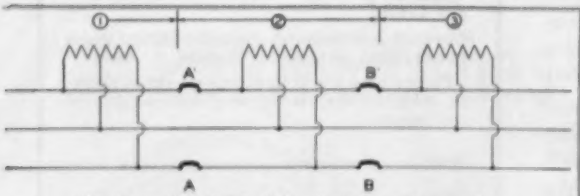
Secondary

CIRCUIT BREAKERS

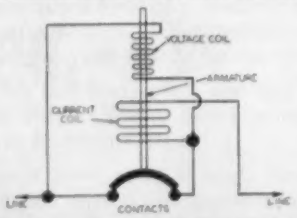
The fundamental advantage of banking transformers on a secondary is to distribute the load over several small units rather than force each transformer to handle the load in its immediate location.

Kearney Secondary Circuit Breakers make secondary banking practical and profitable. They are normally installed at points of minimum current interchange between transformers. When a fault occurs in one section, adjacent breakers open to protect unfaulted sections. When the fault clears itself, the breakers automatically reclose and restore service. On permanent faults, the breakers remain open, isolating the faulted section to prevent cascading of the outage to unaffected circuits.

Write today for descriptive information.



Portion of a typical banked secondary with sectionalizing breakers AA' and BB' installed



Internal wiring details of the breaker showing potential and current coils

JRK 282W

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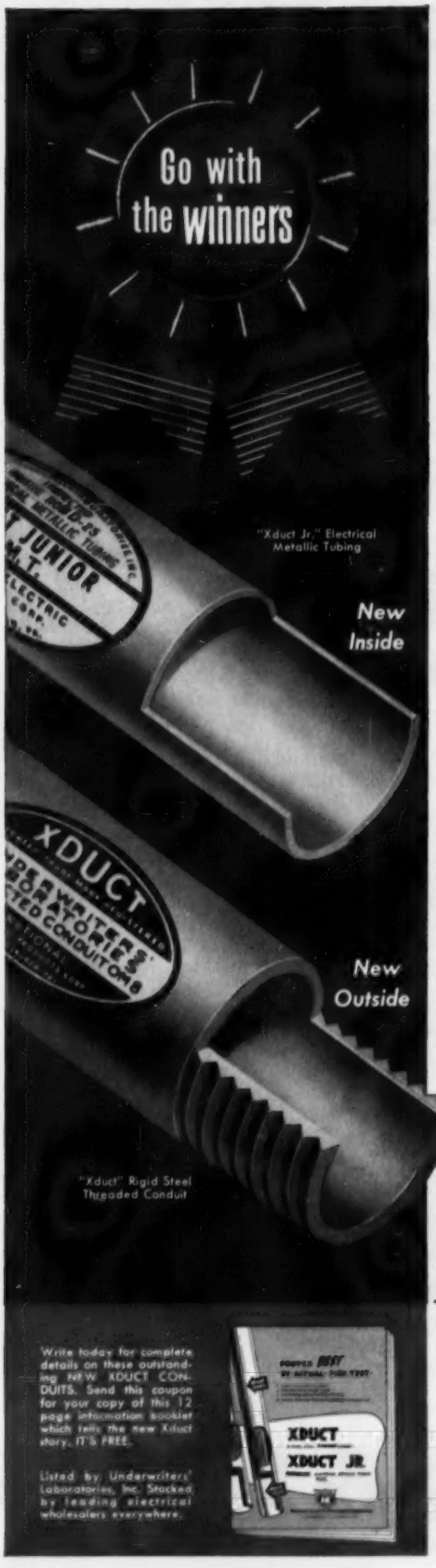
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National Electric XDUCT conduits

These are the features that make the *new* National Electric Xduct Conduits sure winners with electrical contractors everywhere:

1. Easiest Fishing Conduit!

"Xduct's" new baked-on inside coating of aluminum enamel provides minimum friction between conduit wall and wires. The result: Fishing tests conducted with five other leading brands of conduit prove "Xduct" is 66% easier to fish on constant pull—more than twice as easy to start.

2. Maximum Corrosion Resistance!

Pure zinc is deposited *uniformly* over the entire outside surface of "Xduct" conduit by a new electroplating process. The result: a protective coating that adheres positively to the basic steel.

3. Positive Thread Protection!

Sharp, clean threads of "Xduct" rigid steel conduit are machined before galvanizing to assure complete protection from end to end. The result: every hill and valley of threads are completely galvanized.

4. Superior Working Qualities!

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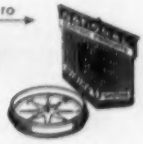

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Please send me your free booklet on the new Xduct Conduits.

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Super power transformers pace utility expansion

Highest rated transformer ever installed in U.S.

THIS is a 230,000-kva, three-phase power transformer, one of eight of this rating built by Allis-Chalmers to step up voltage for transmission from a steam generating station. Seven of the eight units have been shipped; the eighth will be shipped this year.

This enormous power transformer is an example of the record-breaking, trend-setting units built by Allis-Chalmers for power systems all over the country. Here are some of the features worth noting:

- Like all Allis-Chalmers power transformers, it is corona-free. Regardless of its tremendous size and great number of parts, the creeping deterioration of corona can never shorten this transformer's useful operating life.
- New aluminum welding techniques developed by Allis-Chalmers make this unit 15,000 pounds lighter than standard designs. Structural members are the same strength as before, but weigh far less, so that shipment and installation are easier.
- This transformer tested well below requirements specified for noise. One reason: the extra-quiet cooling system, using Allis-Chalmers developed *Electro-Coolers*. By increasing the number of fans and reducing the individual diameters of each fan, Allis-Chalmers engineers were able to reduce this source of noise significantly without impairing efficiency. Continuous noise research at Allis-Chalmers includes tests of completed transformers at a 10-acre outdoor proving ground where exact field conditions can be duplicated.

An Allis-Chalmers representative will be glad to discuss these and other transformer developments with you at your convenience. Call the nearby A-C office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4715

NEW ERA
IN POWER
TRANSMISSION

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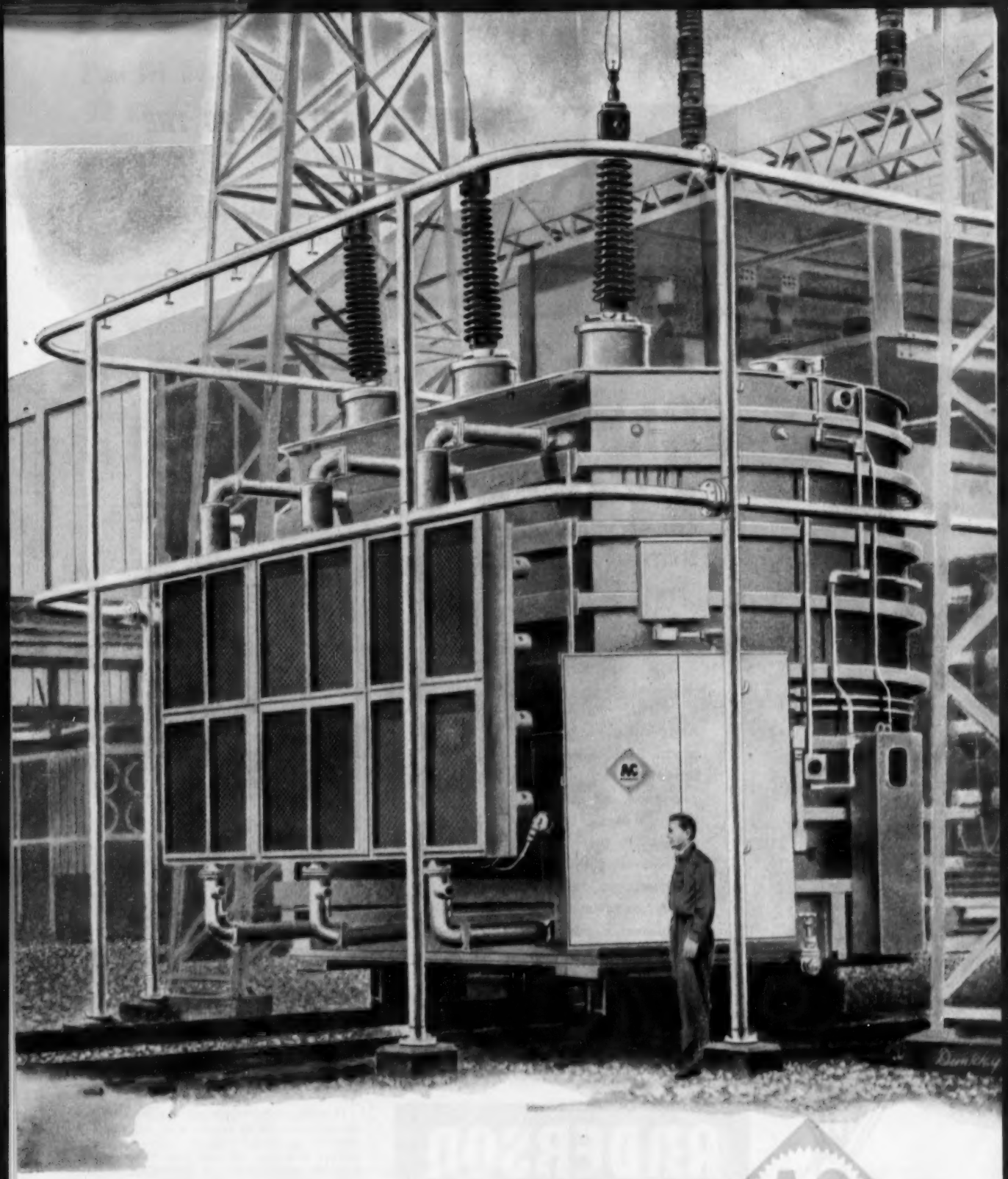
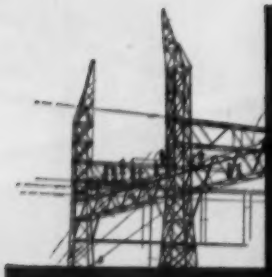


CHALMERS

A-C ALLIS-CHALMERS

General Machinery Divisio



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★ EASIER INSTALLATION

Anderson cast aluminum electrical products are specially designed for *increased conductor life, minimum power loss, and easier handling.* Every safety factor has been carefully engineered into these superior electrical products . . . they're made to withstand extreme loading, sudden shock and stress reversals far in excess of established standards...they're heat-treated for greater strength.

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For more complete information consult your nearest ABW representative or contact our home office.

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LETTERS TO THE EDITOR

Speaker Misquoted

To the Editor:

This is to direct your attention to an error in reporting, which appears near the top of Col. 2, p 91, of the April 1955 issue of ELECTRICAL WEST.

The erroneous statement appears in a brief of a paper presented by myself at the recent PCEA convention at Pasadena. It reads as follows: "Keezer urged cancellation of General Order No. 95 of the California PUC."

The two other briefs appearing on pp 85 and 92 of the same issue of your magazine are correct summaries of this paper.

I would appreciate your publishing a correction of this error in the next issue of ELECTRICAL WEST.

D. C. KEEZER
Electrical Engineer
Pacific Gas and Electric Co.

ELECTRICAL BOOKS

STANDARDS FOR A STRONG AMERICA, *100 pages, 8½x11, American Standards Association Inc., $3.*

Proceedings of the Fifth National Conference on Standards, together with 40 papers on a wide variety of electrical subjects, are contained in this publication. One important question discussed is: "What effect will international electrical standards have on the future of the electrical industry?"

AUTOMATIC FEEDBACK CONTROL SYSTEM SYNTHESIS, *by John G. Truxal, 675 pages, 6x9, McGraw-Hill Book Co. Inc., $12.50.*

Here is a complete, up-to-date presentation of the methods useful in the design of feedback systems. The highly developed theories of the design and synthesis of linear are covered in detail, and the book concludes with an introduction to the analysis and design of nonlinear systems. It is a graduate-level treatment of servomechanisms and feedback system design.

A PROFESSIONAL LOOK AT THE ENGINEER IN INDUSTRY, *124 pages, 6x9, National Society of Professional Engineers, $3; $1.50 to NSPE members.*

If industrially employed engineers and management are to resolve their industrial relations problems without resort to the divisive influence of collective bargaining for professional personnel, the solution must emanate jointly from the professional engineering society, industry and the professional engineers. This is a general conclusion of the engineer-in-industry committee of NSPE, in this book compiled by the committee. Suggested are a series of remedial actions by management and individual engineers in the fields of professional status, employment conditions and economic status.

(Continued on Page 30)

ROEPLASTIC CONTROL CABLE

Since Roebling pioneered this unique type of cable three years ago sales and repeat orders have skyrocketed—sure proof of outstanding merit.

No painted conductor tracers. Conductors are *one* dark color, each with its IPCEA code color *name* and its *number* distinctly printed from end to end with indelible plastic ink which forms an integral part of the insulation and cannot be erased.

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FREEDOM FROM ERRORS...
CONDUCTOR IDENTIFICATION
THAT IS SIMPLE AS A, B, C
YET ABSOLUTELY POSITIVE...
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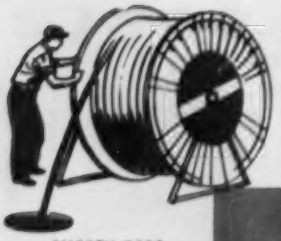

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NO SCORING OR
ABRASION OF SHEATH

EASY TO
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EASY TO TOOL

The Happy Combination

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Complete Protection... Long Life...Low Cost

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COMPLETE LINE OF
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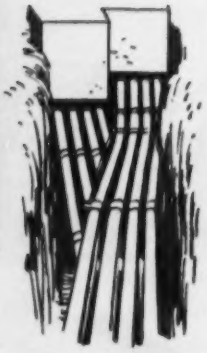

ORANGEBURG
STANDARD

HOW does Orangeburg give cables complete protection? It's tough and strong. It's resilient, and "gives" without cracking or breaking. Its walls are impermeable. Its non-metallic material resists acids, alkalies, oil and salt in ground waters. Its joints are watertight. Its smooth bore reduces danger of abrasion.

WHY such low cost? Because Orangeburg is lightweight and easy to install; it lays faster than any other type of conduit... saves time and money. The long 8-foot lengths mean fewer joints to make. The Taper Sleeve Joints seal watertight with a few light taps. It lasts indefinitely... gives years and years of economical service.

Orangeburg is a leader in every city and state. For data about Fittings, Angle Couplings and Bend Sections, write Dept. WE-45.

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NOCRETE INSTALLED WITHOUT CONCRETE

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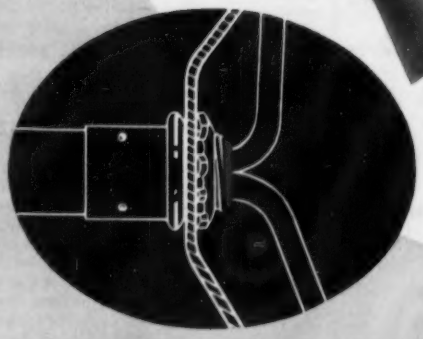

1. Protruding rounded red plastic lip of bushing prevents cutting of insulation—eliminates shorts.
2. Full thread screws into all conduit fittings. Lip of RED THROAT bushing protects thread from damage.
3. Deep dished eight pronged lock nut is easier to drive on—screws flush to shoulder and digs into metal of box for vibration proof positive ground.
4. Permanent locked-in bushing insures smooth burr-free raceway for easy fishing. No extra work and costs no more.

Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

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All B-M Indenter Fittings are U.L. Approved as concrete-tight and for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

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ELECTRICAL BOOKS

Starts on Page 26

MAGNETIC AMPLIFIERS, *by Dr. Herbert F. Storm, 545 pages, 6x9, John Wiley & Sons Inc., $13.50.*

Virtually any question that may arise in the field of magnetic amplifiers is dealt with in this graduate-level book. It begins with the simplest form, the ordinary saturable reactor, and progresses through higher forms to the self-saturated magnetic amplifier, also known as the amplistat or magamp. The behavior of magnetic amplifiers is explained from fundamental physical principals, avoiding mathematical complexity.

RADIANT HEATING, *by Richard W. Shoemaker, 346 pages, 6x9, McGraw-Hill Book Co Inc., $7.*

Practical planning and construction help on how to design and install radiant heating systems make this book useful to modern contractors, heating engineers and architects. Step by step, the thorough detailed discussion gives methods for designing installations that meet a variety of requirements in all types of structures, private homes, factories and public buildings.

STEAM, ITS GENERATION AND USE, *600 pages, 9x11, The Babcock & Wilcox Co. $10.*

This is the 37th edition of a book now famous in the electrical industry after 80 years since the original edition. Material was prepared and edited by engineers and specialists within the B&W company. It is written primarily for use by mechanical engineering students in the applied thermal field.

TRANSISTOR AUDIO AMPLIFIERS, *by Richard F. Shea, 219 pages, 6x9, John Wiley & Sons Inc., $6.50.*

This book provides the practical fundamentals of transistor applications and shows how they may be used in the construction of audio amplifiers. Employing a minimum of mathematics, the author explains how the reader may apply these principles in his designs, avoid pitfalls, achieve the ultimate in performance from transistor devices. Various methods of coupling transistor stages together are analyzed and data presented on variation of transistor parameters with operating point.

ANALYSIS OF FEEDBACK CONTROL SYSTEMS, *by Robert A. Bruns and Robert M. Saunders, 383 pages, 6-9, McGraw-Hill Book Co. Inc., $7.50.*

Dealing with servomechanisms and automatic regulators, the book presents an understandable treatment of feedback control components and systems. Basic theory of components are given and recent developments in nonlinear and discontinuous systems are included, giving a survey of components and a sound approach to system theory. Illustrative examples are used especially in the system theory chapters. Components covered include electrical, magnetic, mechanical, pneumatic and hydraulic elements.

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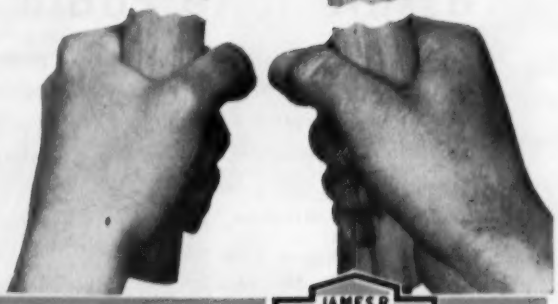
SERVICE ENTRANCE SLEEVES

. . . They Squeeze On in Seconds

Here's how to help your crews make faster, neater and more dependable service entrance hook-ups. KEARNEY Service Entrance Sleeves are designed and engineered to make quick connections that cannot loosen.

These sleeves are available in sizes to fit all commonly used conductor combinations. Sizes are instantly identified by the color-coded plastic caps that seal KEARNEY's Conductive Paste inhibitor (Kearnaline) into every sleeve.

Just a few indents with KEARNEY's specially designed hand tool and one man will make perfect connections easily . . . better connections than with older type connectors.



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Left — Heavy, felted asbestos walls are applied over and under the varnished cambric tapes . . . then thoroughly impregnated . . . *Right* — then the impregnated asbestos is compressed to a dense, homogeneous wall that ensures long cable life.

look beneath the braid

. . . that's where quality begins

felted asbestos walls assure long cable life

N.E.C. Type AVA cables may look alike, but a look under the braid shows how time-proven *Rockbestos* A.V.C. Type AVA is built to ensure long life.

Each asbestos wall in *Rockbestos* A.V.C. construction is a dense, homogeneous, "seamless tube" . . . long, silky fibres of asbestos, thoroughly impregnated with selected compounds, make a nonporous, permanently heat-resistant wall. Heat dissipation is uniform. Dielectric strength is maintained under severe conditions. This seamless construction cushions the cable, protects the varnished cambric from rupture in the sharpest bends.

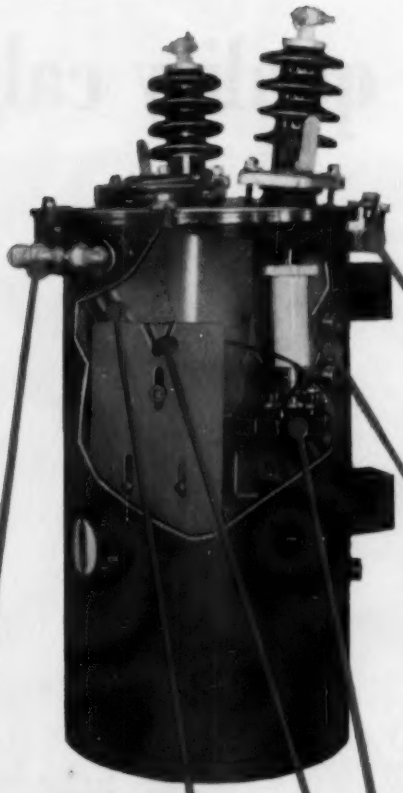
Write for the test and construction specifications of *Rockbestos* A.V.C. available in the new booklet: "Specification RSS-88".

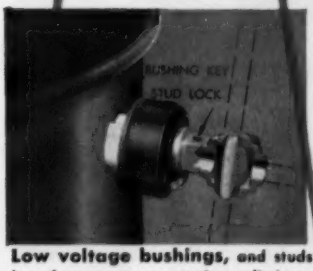
STOCKED COAST TO COAST
Standard Rockbestos A.V.C. construction (N.E.C. types AVA, AVB, etc.) are available for immediate shipment. Call or write nearest branch office.

ROCKBESTOS PRODUCTS CORP.
NEW HAVEN 4, CONNECTICUT

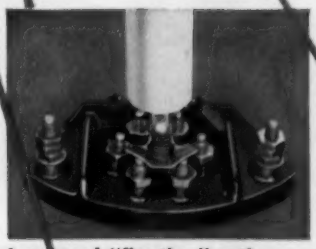
NEW YORK • CLEVELAND • DETROIT • CHICAGO • PITTSBURGH • ST. LOUIS • LOS ANGELES • NEW ORLEANS • OAKLAND, CALIFORNIA

NEW KUHLMAN FEATURES

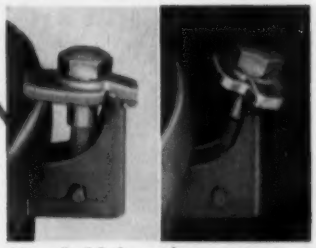




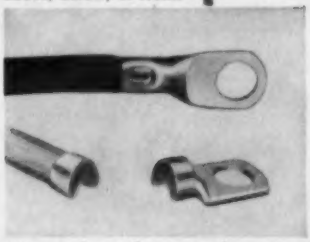
Low voltage bushings, and studs keyed to prevent rotation, eliminate all possibility of internal short circuits. Bushing connectors are designed for three way entrance of low voltage leads . . . from above, below, or front.



Improved "floating" action tap changer maintains positive pressure on both contacts by a spring actuated self-aligning mechanism.



New hold down bars and nuts of forged brass maintain a uniform pressure-seal on transformer tanks . . . are not subject to rust or corrosion . . . do not have to be disassembled to remove cover as illustrated above (right).



New crimped connections guarantee pullout values equal to 85% of the cable tensile strength and greater than 100% relative conductivity.

New die-formed indented slot in core clamp allows greater lifting hook clearance for ease in handling or removing core and coil assembly.

Provisions for mounting either valve or expulsion type arresters are made on all Kuhlman transformers built to EEI-NEMA standards through 100 KVA single phase and 150 KVA three phase.

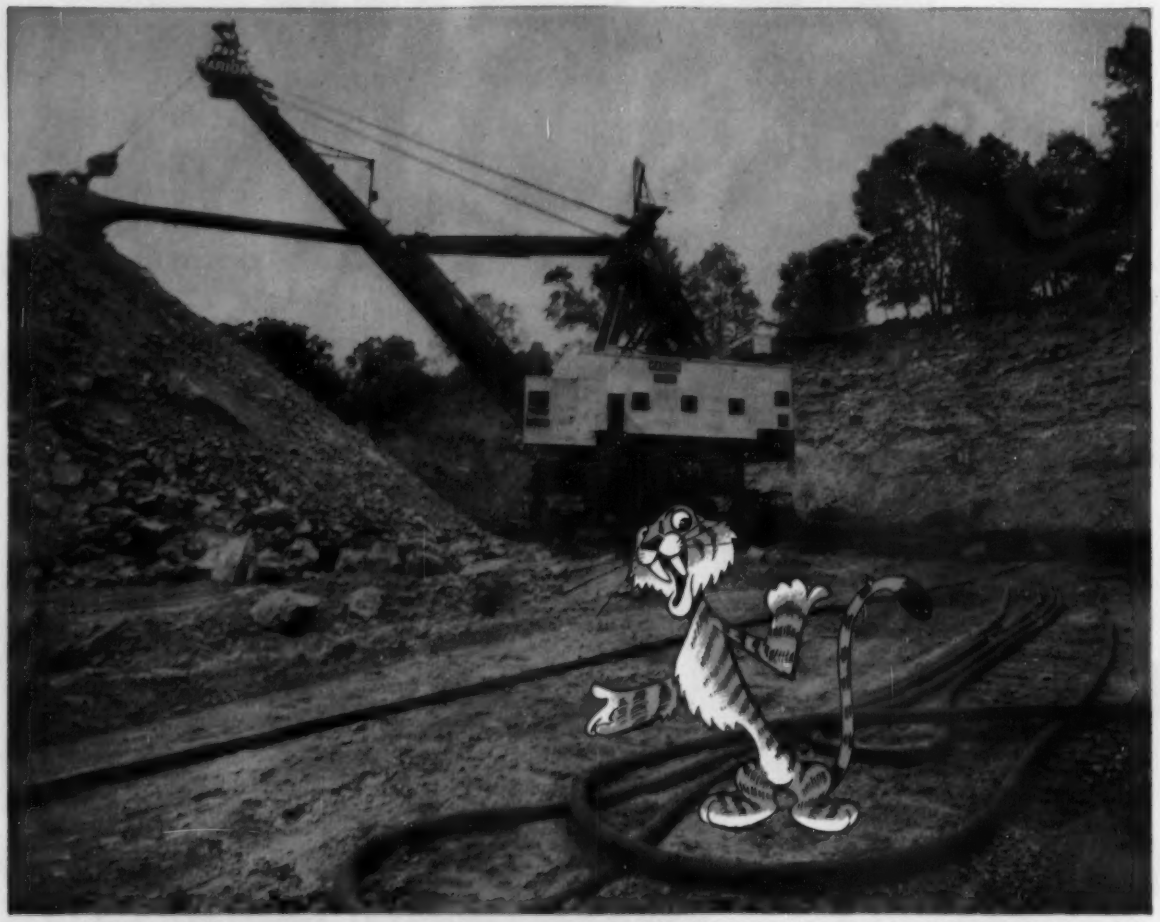
KUHLMAN

169

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

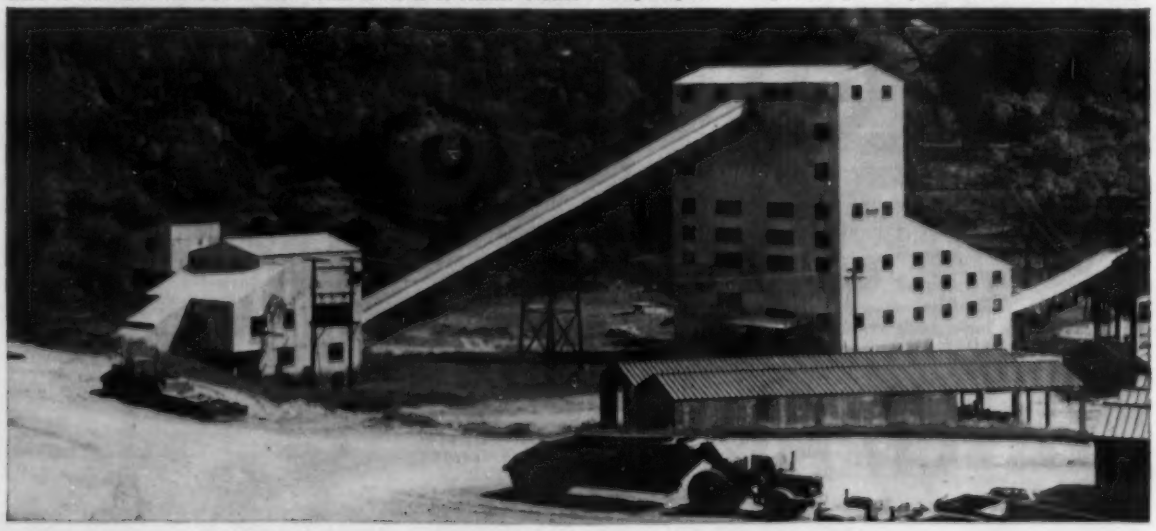
DISTRIBUTED BY **MAYDWELL & HARTZELL, INC.** • SEATTLE • SPOKANE • PORTLAND • SAN FRANCISCO • LOS ANGELES • PHOENIX

They needed a top quality cable

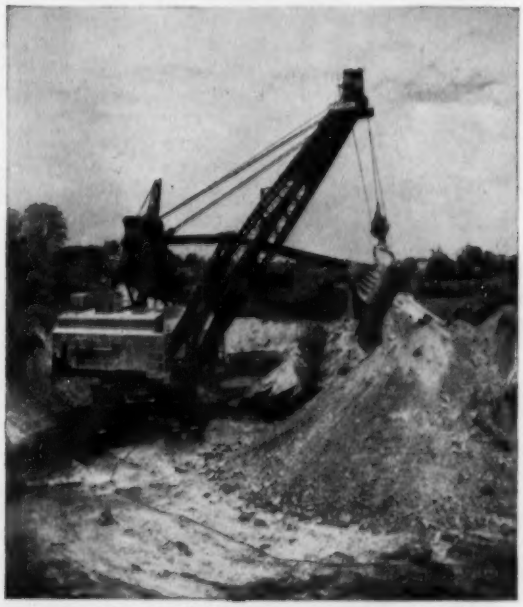


THE 18-CUBIC-YARD SHOVEL moves a lot of overburden in a hurry. It is supplied with 7500 feet of 3-conductor 1/0 Tiger Brand Amerclad.

HERE IS THE MINE HEADQUARTERS. Wash tower is at center. Notice conveyor system at right that goes to power station over the hill.



like *Tiger Brand* for this high production strip mine



HERE IS A PORTRAIT of the 45-cubic-yard shovel that has removed most of the overburden at this mine.

IF you take a ride out near Zanesville, Ohio, someday, you'll spot the new Muskingum Mine—probably the most modern strip mine in the world. It supplies coal for the new 400,000 kw Muskingum River Plant of The Ohio Power Company, part of the American Gas and Electric System.

The big 18 and 45-cubic-yard electric power shovels operate day and night through sun, rain or snow. And when you consider the eye-popping cost of lost production time, it's easy to see why these shovels need the most dependable power cable on the market. At this mine, it's 100% Tiger Brand Amerclad.

The cable is always exposed to foul weather and accidental abuse. It often stretches for more than a *mile* from switchgear to shovel take-up reel. Yet, after more than 2 years on the job, the Tiger Brand Amerclad is in perfect condition without sign of wear.

If you need a cable that can *take it* . . . if you want cable for a power shovel, dredge, mine locomotive, welding machine or a heavy-duty electrical hand tool—you'll get more for your money if you specify Tiger Brand Amerclad. Drag it through puddles, over sharp rock; spill gasoline or oil on it and expose it to sun and ozone. Tiger Brand will still give you service you never thought possible. *Send the coupon.*

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☐ I'd like to talk to your representative.

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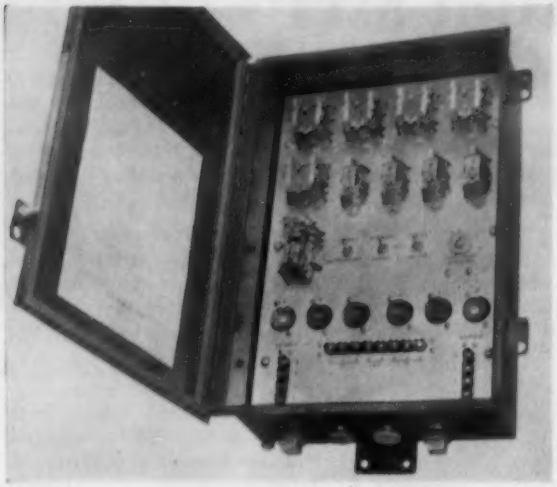
Address .....
City ..... State.....

USS Tiger Brand ELECTRICAL WIRE & CABLE USS

UNITED STATES STEEL

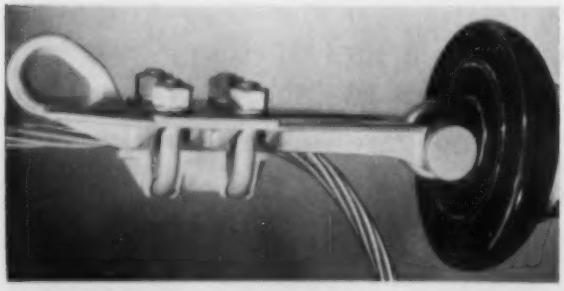
PRODUCT NEWS



Load Transfer Control

(1) Line Material Co., Milwaukee 1, Wis.

Reliable load transfer from a preferred feeder to an auxiliary feeder is claimed for this automatic control. It is designed for use with the company's NR and VR oil switches. The control is enclosed in a weatherproof steel cabinet. It features fused control circuits, adjustable time delay, relays completely wired to terminal strips and an interlock mechanism.



Dead-end Clamp

(2) Burndy Engineering Co. Inc., Norwalk, Conn.

A new dead-end clamp, type CUW-A-E, for aluminum and ACSR overhead lines has been developed by this company. The clamp is constructed of aluminum alloy and has galvanized steel U-bolts and clevis pin. Only one wrench is required for installation. Reported holding strengths range from 3,300 lb for 4/0 aluminum to 15,000 lb for 795-MCM (26-7) ACSR.

For Additional Information Fill in the Coupon on Page 54

Residential Load Center

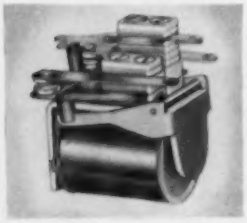
(3) General Electric Co., Trumbull Components Dept., Plainville, Conn.

A new 12-circuit residential load center with a 100-amp main breaker wired into the box has been announced by this company. The need for a separate main entrance switch is eliminated by a "combination" design with the main and branch circuit breakers enclosed in a single unit. The unit is rated for use with 100 amp, 120/240-v a-c, single-phase, three-wire service, according to the manuturer.

Midget Relay

(4) Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.

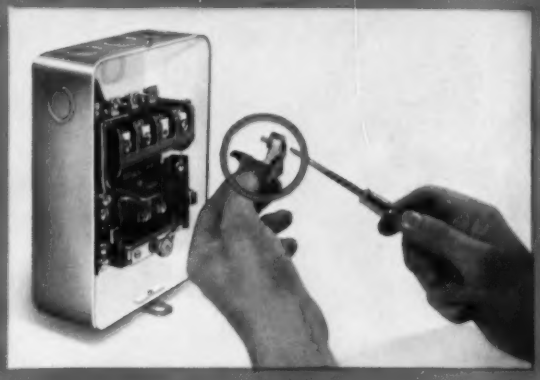
Special heavy-duty contacts are now available on this new Guardian series 595 direct-current telephone-type relay. It is reported that the unit can withstand an inrush current of 50 amp at 28 v, d-c. Exclusive coil and armature design makes the relay exceptionally powerful for its size and weight. It is 1¼ in. long, weighs 2½ oz. It is rated for continuous operation at 15 amp, 28 v, d-c.



Removable Truck Tracks

(5) P & G Supply Co., 2262 N. Albina St., Portland 12, Ore.

Designed to fit most tires, these truck tracks are reported to be easy to mount and adjust. The manufacturer says they give up to 500% greater flotation. Tracks come in standard width of 15 in., or heavy-duty width of 18 in. Both are available for single or tandem axles.



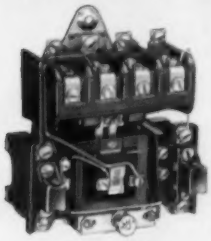
ADD

ONE OR TWO PILOT CONTACTS

to Sizes 0 to 3 Allen-Bradley Solenoid Starters

It's so easy to add one or two extra pilot contacts to Allen-Bradley solenoid starters for operating pilot lights or an additional relay or two. These auxiliary contacts are available with either single pole normally open or normally closed contacts, or with normally open—normally closed contacts.

AUXILIARY CONTACTS FOR BULLETIN 709 SIZES 0 & 1 SOLENOID STARTERS



SIZES 0 & 1 SOLENOID STARTERS

This is a typical Allen-Bradley Size 0 or Size 1 solenoid starter without external auxiliary contacts.

AUXILIARY CONTACTS SIZES 0 & 1

These are two Bulletin 895 auxiliary pilot contacts which are attached to the arc hoods of Bulletin 709 Sizes 0 and 1 solenoid starters. Be sure to specify the size of starter when ordering these Bulletin 895 auxiliary contacts.

ONE AUXILIARY CONTACT

Here is the same Bulletin 709 solenoid starter with one auxiliary contact fastened to the arc hood.

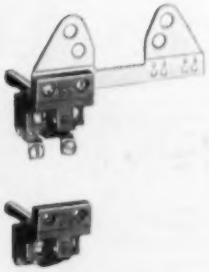
TWO AUXILIARY CONTACTS

This is the same Bulletin 709 starter to which have been added two Bulletin 895 auxiliary contacts.

AUXILIARY CONTACTS FOR BULLETIN 709 SIZES 2 & 3 SOLENOID STARTERS

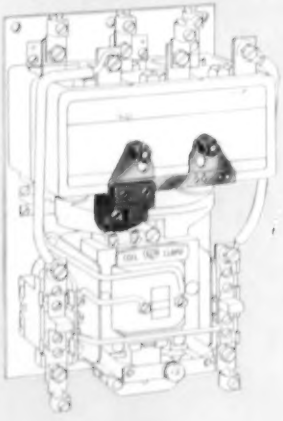
SIZES 2 & 3 SOLENOID STARTERS

This is a typical standard Allen-Bradley Size 2 or Size 3 solenoid starter with no auxiliary contacts. Arc hood bolts are used to hold auxiliary contact mounting plate.



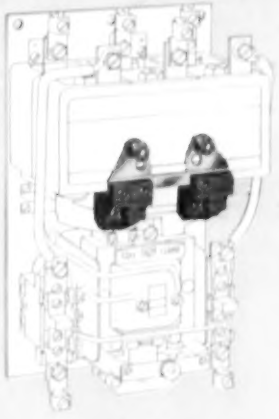
AUXILIARY CONTACTS SIZES 2 & 3

The mounting plate, shown above, is required to support the auxiliary pilot contacts on these larger starters. The same mounting plate fits the Size 2 or Size 3 arc hood bolts. It holds one or two auxiliary contacts, as shown at the right.



ONE AUXILIARY CONTACT

Here is the Size 2 or Size 3 Bulletin 709 solenoid starter to which has been added one Bulletin 895 auxiliary contact. No disturbance of existing wiring in the starter.



TWO AUXILIARY CONTACTS

This is the Size 2 or Size 3 Bulletin 709 solenoid starter equipped with two Bulletin 895 auxiliary contacts on one mounting plate. These contacts are easy to install.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

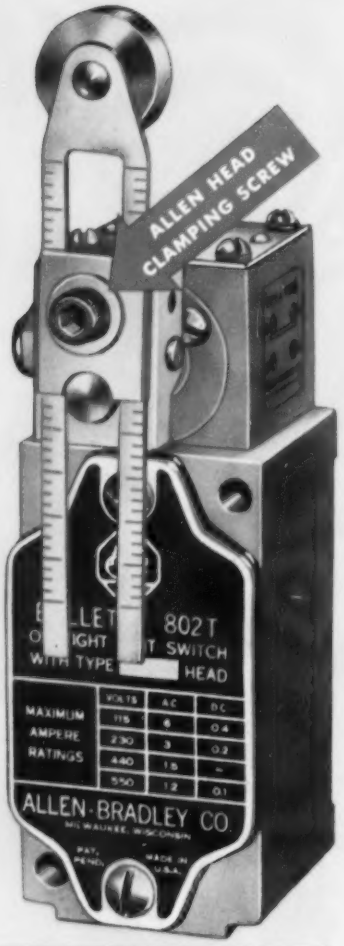
In Canada:
Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
MOTOR CONTROL

4-55-M

NEW!

OILTIGHT LIMIT SWITCH
WITH ADJUSTABLE OPERATING LEVER



Another handy unit has been added to the broad line of Allen-Bradley oiltight limit switches... the NEW Type 802TG limit switch. The operating lever is adjustable from ¾ inch to 3 inches in radius.

The lever can be set at any angle on the shaft, and the operating head can be placed in any one of four positions—0—90—180—270 degrees on the body of the switch.

Like all Bulletin 802T limit switches shown here, the new unit has a snap action switch with double break, silver contacts. There is one normally open and one normally closed contact... electrically separated and protected by an oiltight seal. Terminals are easily accessible.

Roller Lever Maintained Contact

Flush Plate for Mounting Limit Switch in Cavity

Roller Lever Spring Return

Send for this 8-Page Bulletin

Bulletin 802T is a handy selection guide for picking the limit switch best adapted to your needs. Write for your copy, today.

ALLEN-BRADLEY
QUALITY
LIMIT SWITCHES

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. • In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

Fork Lever Maintained Contact

Flush Mounted Fork Lever

Rod Type Spring Return

Top Push Rod Spring Return

Push Roller Spring Return

Side Push Rod Spring Return

Side Push Rod Maintained Contact

4-55-MR

This booklet tells how . . .

This 32-page booklet can help you build or repair apparatus, to operate better at lower cost. Gives properties and advantages, test data, construction drawings, case histories, application details. Also describes the board products and composites.

Quinterra® and Quinorgo® Electrical Insulations lengthen service life...simplify production...cut costs

Quinterra is the pyrolysis-resistant dielectric that helps cut electrical apparatus costs. More and more manufacturers are using it to make apparatus smaller and safer, at lower cost. Its composites are being used in Class "B" and Class "H" motor rewinding. It permits equipment to operate at higher temperatures because it remains a dielectric despite heat and time . . . the bulk of its dielectric strength is in the purified asbestos base sheet. Its mechanical strengths, thinness and flexibility permit economical application.

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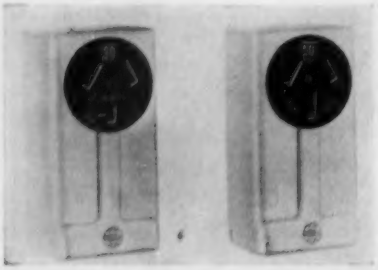
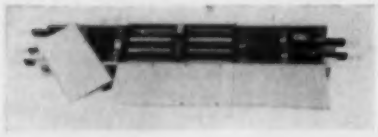


Power Outlets

(6) Harvey Hubbell Inc., Bridgeport, Conn.

Available in both 30- and 50-amp ratings, these surface-type power outlets are reported to be designed to comply with UL requirements. The 50-amp unit features a swivel-nut assembly said to reduce installation time and trouble. The 30-amp unit features an L-shaped slot that prevents interchange with 50-amp units. Cover and back plate have aluminum finish. Knockouts for either flexible BX or rigid conduit.



Adjustable Bus Duct

(7) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

An adjustable straight length of bus duct recently introduced by this company can be lengthened or shortened on the job as much as 6 in. According to the manufacturer, the new fitting is designed to facilitate the layout and installation of bus duct by decreasing the precision required for good results. The standard 5-ft length for plug-in bus duct is continuously adjustable from 4 ft, 6 in. to 5 ft, 6 in. Fittings available in copper or aluminum for all ratings of plug-in duct and for all indoor low-impedance duct having two bars per phase.

Duct Rodding Machine

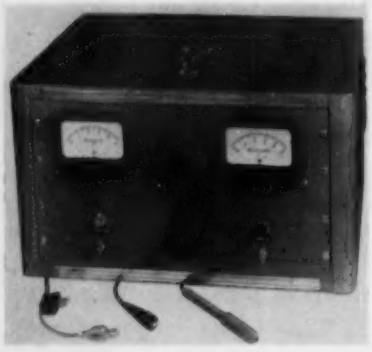
(8) Petersen Engineering Co., Santa Clara, Calif.

A machine capable of rodding underground power ducts to a distance of more than 1,000 ft is announced by this manufacturer. Patented equipment causes the rod to revolve clockwise in the duct as it pays out, returns or holds the rod steady without shifting gears or stopping, according to the manufacturer. Ask about Pengo series 600 duct rodding machine.

Conduit Tapering Tool

(9) Line Material Co., Milwaukee 1, Wis.

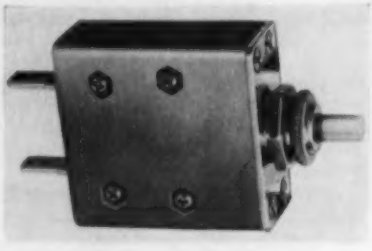
This self-feeding tapering tool will taper and face conduit ends to factory exactness, according to the manufacturer. The new tool, designated type 504-C, is especially designed for the company's 4-in. conduit and was designed to simplify salvaging of field-cut shorts. The tool weighs 8¾ lb, and is furnished with a metal carrying case.



Dielectric Testing Instrument

(10) Associated Research Inc., 3758 Belmont Ave., Chicago, Ill.

Model 424 d-c Hypot is said to be a versatile instrument for dielectric testing up to 5,000-v d-c, and insulation resistance up to 50,000 megohms. Features a 4½-in. voltmeter and 4½-in. microammeter electronically protected against overload. Arranged for standard rack and panel mounting.



Circuit Protector

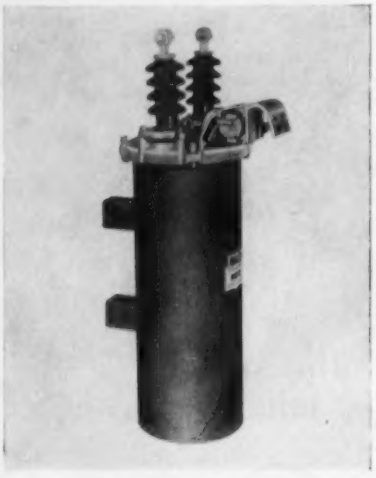
(11) Mechanical Products Inc., 1840 River St., Jackson, Mich.

Two circuit protectors for appliances, the MP-252 for primary circuit safety and the MP-600 for secondary circuits, have been designed by this manufacturer. The MP-252 is for 15-, 20- and 30-amp units, and the MP-600 is for 4- to 30-amp units. According to the manufacturer, appliances are positively protected against excessive overloads and short circuits.

Aluminum-sheathed Cable

(12) Okonite Co., Passaic, N. J.

Known as Okotherm, this new cable is designed for continuous service in temperatures up to 150 C, and up to 200 C under certain conditions. The aluminum-sheathed cable is available for both power and control circuits and provides a labor-saving feature by having its own built-in conduit, the manufacturer reports. More details in bulletin 1088 available from manufacturer.



Automatic Circuit Recloser

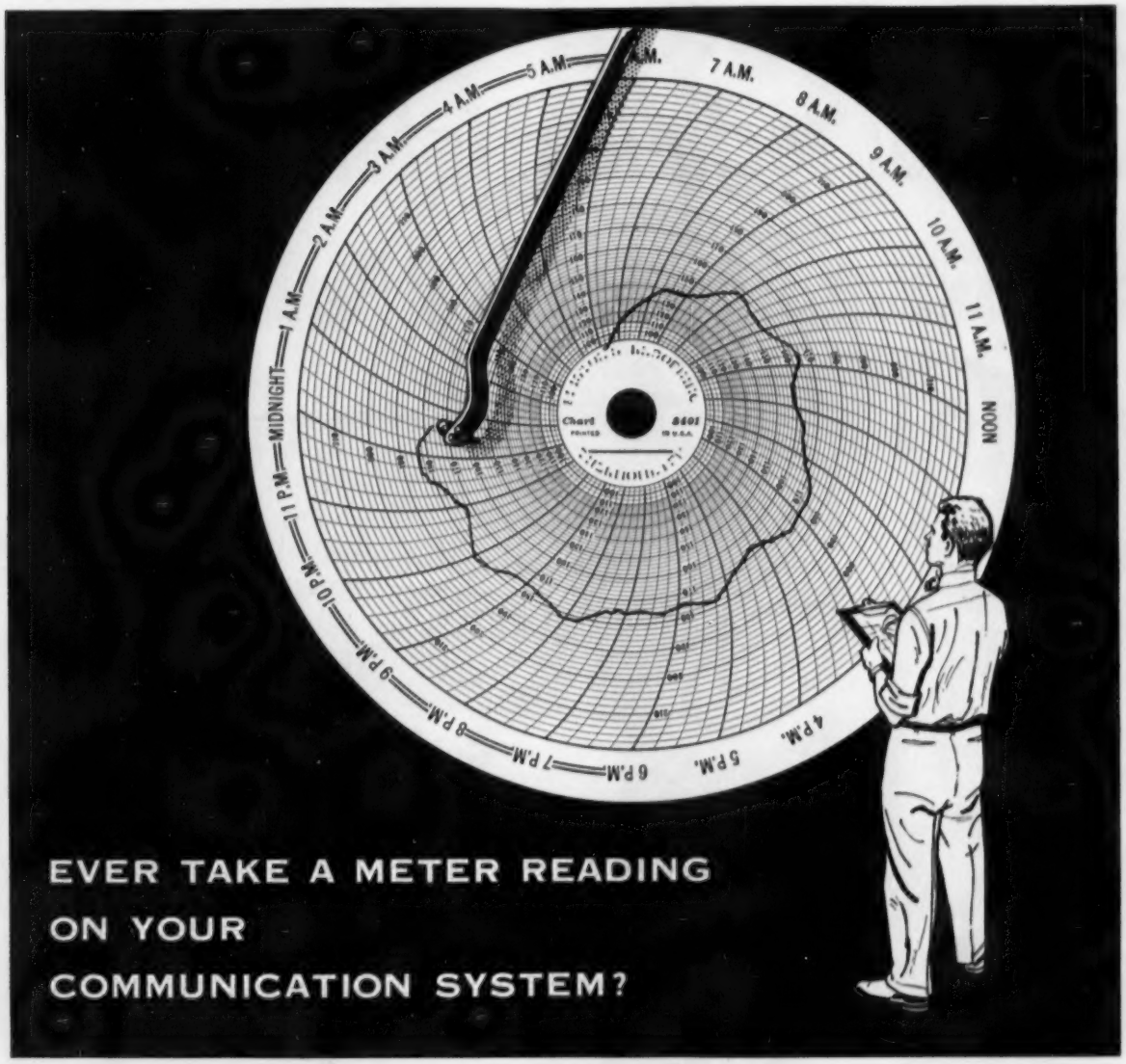
(13) I-T-E Circuit Breaker Co., R&IE Division, Greensburg, Pa.

One-cycle interrupting time and a 20-cycle reclosing time are reported features of this recloser. The manufacturer says the recloser, called MB-2, is applicable up to a nominal voltage of 14.4 kv and will supersede all previous types of R&IE reclosers. The interrupter will accommodate 6,000-amp fault current at 4.8 kv and 4,000 amp at 14.4 kv on a rms symmetrical basis. Maximum fault capacities are said to be 1.4 times these values on an asymmetrical basis of rating.

Panel Enclosures

(14) Hoffman Engineering Corp., 1124 Tyler St., Anoka, Minn.

This product is an all-metal, liquid-proof box to contain electric panels. Welded seams, removable mounting panel and liquid-tight door are features reported by the manufacturer. Available in 15 standard sizes, known as JIC-NEMA 12.



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Guide to Periodic Inspection and Repair of Apparatus Bushings
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This is the first of a new series of valuable technical booklets devoted to apparatus bushing maintenance. They will make your job easier by providing you with up-to-date, authoritative information on the subject of apparatus bushings. In developing these booklets, Locke has drawn upon its vast storehouse of bushing know-how. You'll find them of real value in your everyday work. For your copy, please fill in and mail coupon.

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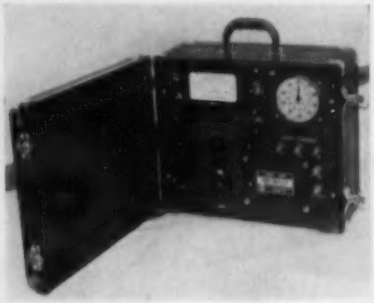
All-silicone Rubber Insulation

(15) Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee, Wis.

What is reported to be the first all-silicone-rubber insulating system for large motors and generators is a new product of this company. Called the Silco-Flex system, it is immediately available for class A and B windings operating under certain service conditions. Features are: little change in dielectric and mechanical properties even in temperatures up to 250 C; flexible and resilient; cooler operating windings resulting from high thermal conductivity of silicone rubber, the manufacturer states.



Test Instrument

(16) Multi-Amp Corp., 10 Third St., Newark 5, N. J.

A portable, high-current test instrument for accurately testing and calibrating overload relays, meter and circuit breakers has been announced by this company. According to the manufacturer, the compact, typewriter-size instrument permits safe and speedy trip-time checks on electrical protective devices either on the line or before installation. Two models available: 1004/44/60 with timer totalizing 60 minutes in seconds and 1/100 of a minute; 1004/44/61 totalizes 60 seconds in 1/100 of a second and one-fourth of a cycle.

(17) INTERRUPTER—Hi-Voltage Equipment Co., 4000 E. 116th St., Cleveland 5, Ohio, has designed a new interrupter for use with its gang-operated disconnect switch, either old or new. The interrupter is known as the Hi-Velocity Interrupter and is notable for its simple yet sturdy construction, according to the manufacturer. Action of the device is described as "sling shot" because the interrupting element is a spring-tempered stainless steel rod that springs upward so an arc cannot occur.

(18) BRUSH—An improved carbon brush design has been announced by the Helwig Carbon Products Co., 2540 N 30th st., Milwaukee 10, Wis. A Melamine pad, which replaces a riveted metal hammer plate, is bonded to the top of the brush, eliminating the possibility of flashovers and reducing spring wear on contact surface, the manufacturer states.

Colored Extension Cord

(19) Royal Electric Co. Inc., Pawtucket, R. I.

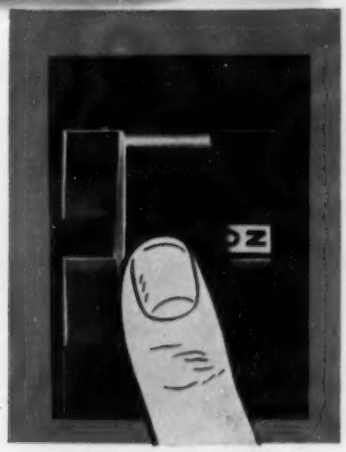
A new, bright red heavy-duty extension cord is being offered by this company. Safety features of the distinguishing color are many, since the manufacturer reports that it is easily seen against most backgrounds. The UL-listed cord is available in five different lengths and features a heavy-duty molded cap and connector with built-in strain reliefs.

Insulator Supports

(20) Gedney Electric Co., RKO Bldg., Radio City, New York 20, N. Y.

Dual-purpose use as beam clamps or insulator supports is a feature of this company's newest electrical fitting. They are available with a variety of jaw openings and tappings in a standard range of sizes. Made of cadmium-plated malleable iron. Holding screw is case hardened.

For More Data Fill in Coupon, Page 54



NEW DUO-GUARD PUSHMATICS® eliminate fuses . . . provide push-button convenience, double safety.

RESIDENTIAL BUILDING IS BOOMING, creating a big market for BullDog Electri-Centers—available in 12-, 14-, 18- and 20-circuit capacities. Pushmatic breakers for the Electri-Centers are interchangeable and are available in 15-, 20-, 30-, 40- and 50-amp. ratings. Listed by UL.

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Push the sale of Pushmatic Electri-Centers and *push up* your profits. Easy to stock, easy to sell, easy to install. Write BullDog Electric Products Company, Detroit 32, Michigan.

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full 90° bend with one stroke of the ram . . . easy portability . . . extra versatility

Here's the kind of real portability you've been looking for in a bender for ½" to 2" pipe and conduit. Using light, but strong, aluminum alloy for many parts, the new GREENLEE No. 880 Hydraulic Bender is unusually *lightweight*, yet extra rugged, fast, powerful . . . produces 15 tons of ram force! One man can easily carry and operate it to quickly make uniform bends. Complete 90° bends can be made with one ram stroke. Separate two-speed hydraulic hand pump and bending ram simplify handling and setup. Easily operated by hand or may be teamed with a GREENLEE Power Pump for fast production jobs.

Attachments also available for bending thin-wall conduit, tubing, bus-bars. Get complete details on how to speed jobs and get better results with the new GREENLEE No. 880 Bender. Write for Bulletin E-217.

GREENLEE

GREENLEE TOOL CO.
1765 Columbia Ave., Rockford, Illinois

Business Computer

(21) Remington Rand Inc., Fourth Ave. & 23rd St., New York 10, N. Y.

Announcement of the Univac II, an advanced model of the earlier Univac, has been made by this company. According to reports, the new machine doubles the speed and capacity of the former. It features a magnetic-core memory system capable of retaining 24,000 characters and able to execute instructions at the rate of 8,000 per minute, the manufacturer states.

Aluminum Bus Conductor

(22) Reynolds Metals Co., 2500 S. Third St., Louisville, Ky.

Known as RABC, this new aluminum bus conductor is reported to have been developed with the optimum combination of strength and conductivity. The minimum tensile strength is reported to be 29,000 psi. The manufacturer states that lower cost is a primary feature of the new product.

Penetrating Compound

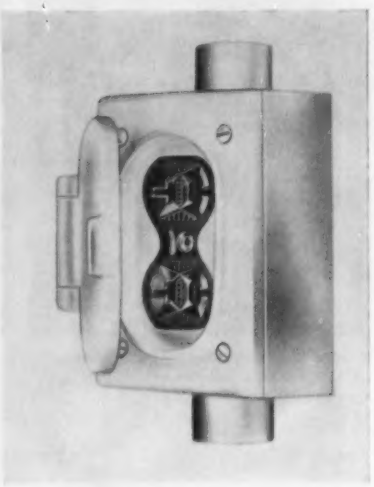
(23) Olin Mathieson Chemical Corp., 10 Light St., Baltimore 3, Md.

A new nonoily penetrant for loosening corroded nuts or mechanical parts is a product of this company. Said to be particularly suited to electrical work, the penetrant is nonflammable and odorless, according to the manufacturer's report. Known as Puritan Penetrant.

(24) **STARTERS**—A new line of air-break starters for 2,200-5,000-v squirrel-cage wound-rotor and synchronous motors has been announced by the Electric Controller & Mfg. Co., Cleveland, Ohio. They come in three styles: 50,000-kva interrupting capacity; with power fuses for systems of 150,000 kva and 250,000 kva availability; in the Valimitor (volt-ampere-limitor) style in which air core reactors limit infinite kva to a finite value within the rating of the starter.

(25) **COMMUNICATION**—Allen B. Du Mont Laboratories, 750 Bloomfield Ave., Clifton, N. J., has announced two new base stations for users of mobile radio systems, designed for the 25-54- and 450-470-mc bands respectively. Other new items added are a control head and mounting bracket design permitting a single unit mobile radio communication installation where no truck is available for mounting chassis equipment and a remote control unit for mobile radio equipment.

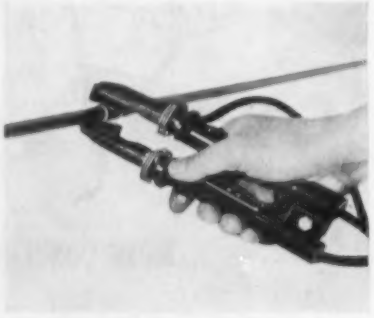
(26) **RECEPTACLE**—A three-wire wall outlet made by John I. Paulding, New Bedford, Mass., comes with a green-colored hex head grounding terminal; is designed to eliminate danger of shock. It is for side wiring, with either BX or Romex; is rated at 15 amp, 125 v or 10 amp, 250 v, UL listed.



Receptacle Cover

(27) Pyle-National Co., 1334 Kostner Ave., Chicago 51, Ill.

This company announces a new duplex attachment plug receptacle cover for its FS and FD Pylets. Made of cadmium-plated ferrous alloy, the cover is said to be weatherproof. An oil-resistant rubber gasket is secured in the center by a metal plate, leaving the perimeter free to float in the recessed groove designed to compensate for irregularities in the cover seating surface, it is stated.



Soldering Pliers

(28) Wassco Electric Products Corp., Joliet, Ill.

Easy portability, versatile use on copper tubing or wire and cable, and plug-in operation from nearest electrical outlet are stated features of this new No. 10554 portable soldering set. Push-button heat control in the handle is said to simplify operation. Details available in bulletin No. 105H.

Use Coupon, Page 54, to secure manufacturer's literature on these products

Modern lighting for modern buildings

No modern building would be complete, even with its "curtain walls" of glass or aluminum spandrels, without an integrated lighting environment. With this premise in mind, Sunbeam Lighting Co. offers a new series of architecturally designed luminous cells. These are surface-type units (#6600 series) with a very shallow appearance and engineered to produce high levels of low brightness lighting. For maximum interior design and illumination potential over six types of modern diffusing mediums are available. Translucent white, "drop" Plexiglas panels and miniature-celled plastic louvers are particularly attractive for contemporary plans. For detailed information on these Sunbeam Visionaires and our surface-type 2 by 4-foot and 4-foot square "large area" cells please write for bulletin #A47.

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Their VERSATILITY means ECONOMY plus these ADVANTAGES (and more):

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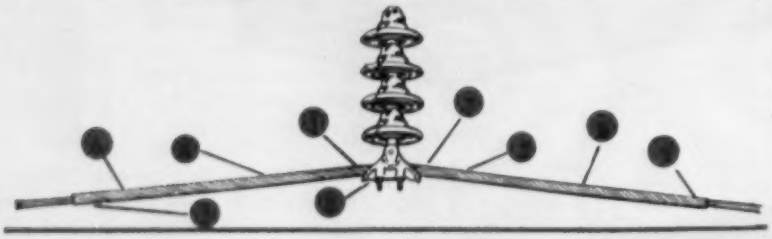
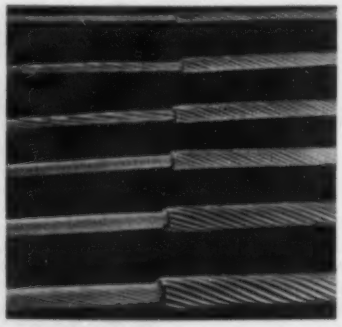


• High standards in design and production of FANNER SUPERFORMED ARMOR RODS based on over 50 years of manufacturing provide unvarying uniformity of application and service. Consult our agents or write direct for additional information on Superformed Armor Rods, Line Guards, Tap Armor and Patch Rods.



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Portable Earth Borer

(29) J. H. Holan Corp., 4100 W. 150th St., Cleveland, Ohio

Suspended by derrick and winch line, guided by a crewman at the hole and driven by power take-off through a telescoping torque arm, this digger is reported to be highly versatile for reaching out over ditches and other obstacles. A ratchet overload clutch dispenses with the need for shearing pins in the event of striking obstructions, the manufacturer reports. Offered for enginewise or counter-engine rotation drives. Ask about model 4401-M. Various cutting heads and augers available.

Thread Protectors

(30) Pittsburgh Standard Conduit Co., Etna, Pa.

This company has introduced thread protectors of polyethylene plastic with different bright colors for each size of conduit. Color coding of the conduit is standard in sizes from ½ in. through 1 in. and, according to the manufacturer, will soon be available in 1¼- and 1½-in. sizes. Protectors are easily removable when conduit is ready to use. Additional information available from the company's Sales Control Center, 61 Bridge St., Pittsburgh 23, Pa.

(31) WIRE STRIPPER—Fabricated of hardened steel, this new hand-type wire stripper has interchangeable blades to strip both stranded and solid wire. Jaws of the tool are held open automatically while removing the wire after stripping. A fingertip touch on the lower handle releases the jaws without changing grip for the next operation. Available from Crown Industrial Products Co., 1221 Amsterdam St., Woodstock, Ill.

(32) PLASTIC TAPE—This new plastic tape is .007 in. thick with a dielectric strength of 1,000 v per mil of thickness average, according to Chase & Sons Inc., Randolph, Mass., the manufacturer. Tensile strength is reported to be 20 lb per inch in width, minimum; stretch is 150% minimum; and adhesion to high polished surfaces is 30 oz per inch in width. Available in 20- or 60-ft rolls.

(33) SPLICE—A newly designed insulated splice comes for No. 4 6/1 and 4 7/1 ACSR; is constructed like two straight-through deadend units attached to an insulating section of tough glass Melamine. Primarily for series street lighting, it can be used for other applications where a run is to be interrupted or terminated, according to the manufacturer, Reliable Electric Co., Chicago, Ill.

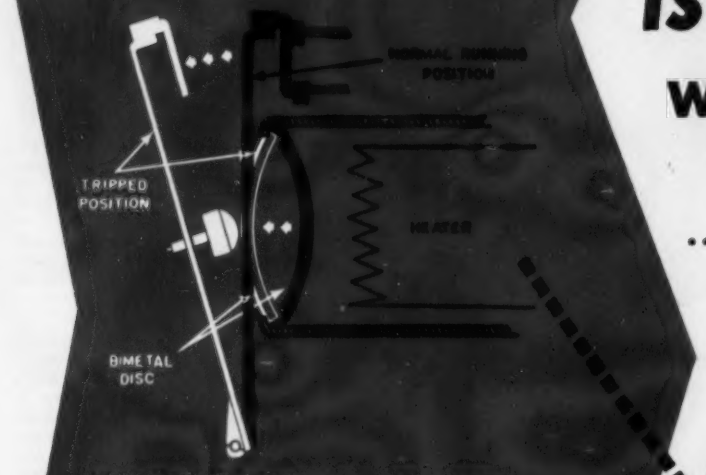
(34) DROP LIGHT REEL—A UL listed drop light cord reel is announced by Vacuum Cleaner Corp. of America, 1724 W. Indiana St., Philadelphia, Pa. The new reel has a lifetime-lubricated reel locking mechanism, heavy-gage steel casing and optional wall or ceiling mounting.

CLICK!...and your motor is saved!

WESTINGHOUSE

offers a surer method of preventing motor burnouts ...the heater is made of

NICHROME*



HERE'S HOW IT WORKS. At a certain temperature, just below that of a dangerous motor overload, a bimetallic disc snaps from concave to convex, instantly breaking the contacts which carry power to the motor. The heater element, made of Nichrome, is wired in series with the motor, acting as a monitor to apply heat to the disc, at precisely the right moment and in the right amount.

The Westinghouse "Life-Linestarter"

Overload controls for electric motors are of course nothing new—but Westinghouse in its Life-Linestarter offers a basically improved, more reliable type of protection against this costly hazard. Whereas other types, depending on solder, gradually lose their critical calibration as the solder oxidizes . . . Westinghouse protects your motors by a bi-metallic disc type overload relay—a precision device which retains its calibration indefinitely.

Every bit as important as the disc is the heater which actuates the disc. This heater element Westinghouse makes of Nichrome, knowing from long experience that since the thermal and electrical properties of Nichrome do not change, the heater retains indefinitely the sensitivity of performance which is all-important.

Like Westinghouse, many leaders of American industry select Nichrome, since they know that the peerless qualities of Driver-Harris alloys are the result of the most precise metallurgical checks and controls. It is these exclusive quality controls that have long made Nichrome V and Nichrome the standard by which all other electrical resistance alloys are measured.

And if the alloy you need does not yet exist, our engineers will be happy to start tomorrow to develop a new one, custom-made for you. Just let us know exactly what you wish to accomplish.

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(35) DERRICKS — Hydraulic derricks that will lower completely to the ground under full power have been announced by American Truck Equipment Co., Swan Island, Portland, Ore. These models HF-19 and HT-25 have load capacities ranging up to 6,000 lb, with front or rear mountings for any standard line truck available. It is claimed that the derrick can be moved from carrying to working position in 30 seconds. Advantages claimed for the additional range are safer, easier handling of winch lines by workmen on the ground and ability to pass the derrick under low overhead lines when setting poles.

(36) THERMOSTAT—A new room thermostat designed for use on such electric heating installations as radiant cable heat, radiant glass panels, radiant electric baseboards and rubber panels is offered by White-Rodgers Electric Co., 1209 Cass Ave., St. Louis 6, Mo. Range is from 55° to 85° with knob setting that can be turned to cold position for temporary shutdown. Electrical ratings are 2,500-w, 120-v a-c or 5,000-w, 240-v a-c.

(37) FIXTURE—A pendant-type vapor-tight lighting fixture for industrial use is offered by Pyle-National Co., 1334 N. Kostner Ave., Chicago 51, Ill. Design is said to be simple and sturdy with special emphasis given to dissipating the heat from high-wattage lamps. An annular slot between the reflector and body permits convection currents around the glass globe to flow upward and escape. Available with dome, deep bowl and 30° angle reflector.

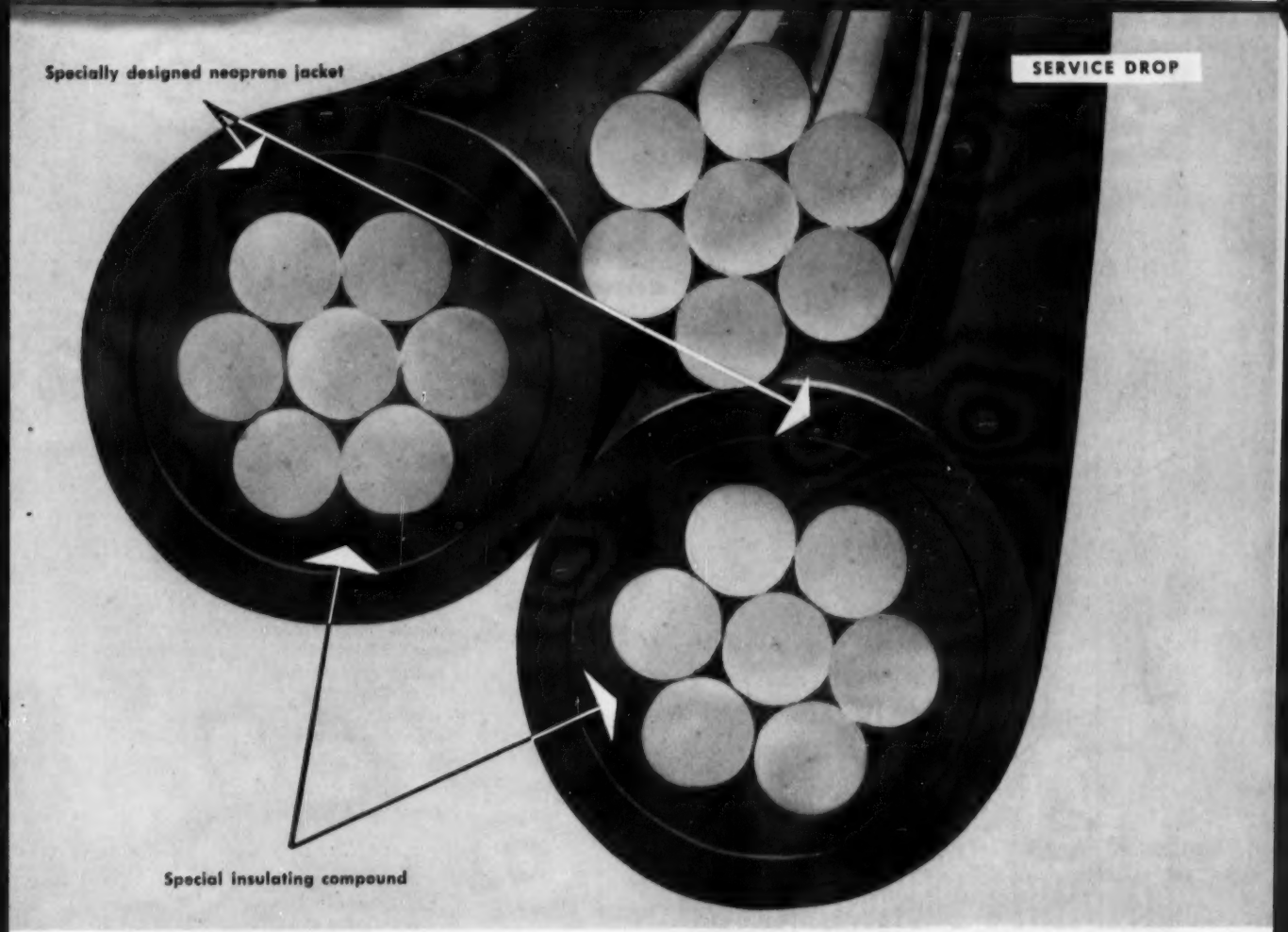
(38) DEVICES—A new line of locking devices consisting of 10- and 20-amp caps and connectors is being marketed under the trade name Eagalok by the Eagle Electric Mfg. Co., Long Island City 1, N. Y. These devices are designed to give a continuous flow of electricity under the severest shock or vibration conditions, it is stated. Included are two- and three-wire caps and connectors.

(39) CORD SET—A shockproof, grounded, three-wire U-blade extension cord set is being offered by Rodale Mfg. Co., Emmaus, Pa. This set was designed to meet new grounding requirements and will accommodate the new three-wire caps. Available in lengths of 10, 25, 50 and 100 ft. Rating is 15 amp, 125 v. UL listed.

(40) CUT-OFF MACHINE — A new bench-type and tube cut-off machine is claimed to cut up to 1,000 pieces of 1¼-in.-OD pipe per hour. It takes all sizes from ⅜ to 1¼ in. OD from light gage to 12-gage wall thickness. Cord connects to 115-v a-c outlet. Made by Continental Machine Co., 1952 N. Maud Ave., Chicago 14, Ill.

(41) LUBRICANT—Designed for use in conducting hinge joint switches, Conducto-Lube is described as a highly conductive top-grade lubricant. According to its manufacturer, Cool Amp Co., 8603 S. W. 17th Ave., Portland 19, Ore., it is ideal for high-speed air blast breakers where a lubricant is essential. It comes in 6-oz jars.

(42) TRANSFORMER — The 167-kva Featherweight has been added to the line of Pole Star distribution transformers made by Pennsylvania Transformer Co., P. O. Box 330, Canonsburg, Pa. It was designed for congested business areas; weighs less than 1,500 lb; is available in standard voltage through 13,200 v.



TWO-WALL CONSTRUCTION, unique with ANACONDA 2+2 Type N-SD cable, gives high mechanical and electrical service reliability.

New 2+2 N-SD Cable gives double protection

ANACONDA 2+2 Type N-SD service drop is designed to out-perform other N-SD cable—both electrically and mechanically.

Its conductors are covered with not one, but two, precisely formulated compounds. Each layer is built to do a single job best.

The inner layer is a high-grade rubber insulation . . . with excellent electrical properties and high heat and moisture resistance.

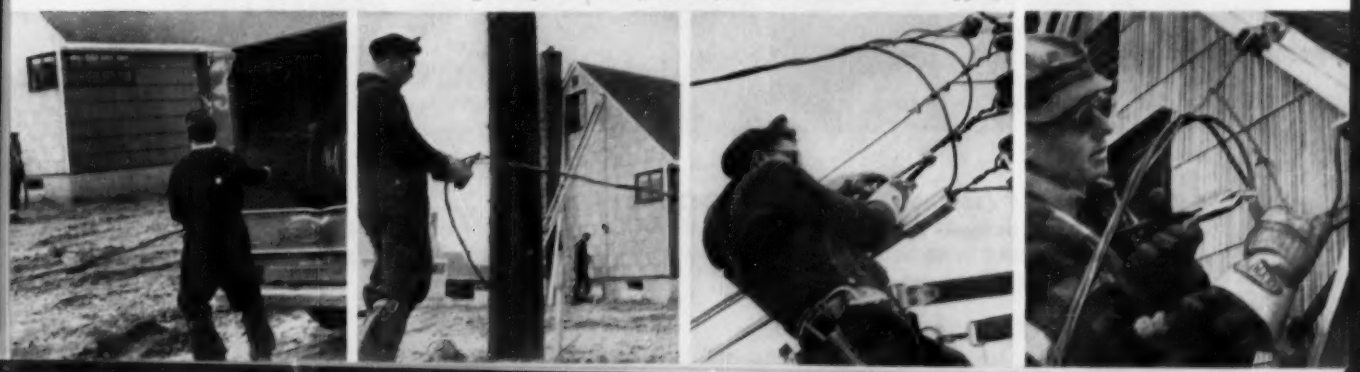
The outer layer is a tough, durable neoprene jacket . . . best for wear and weather resistance.

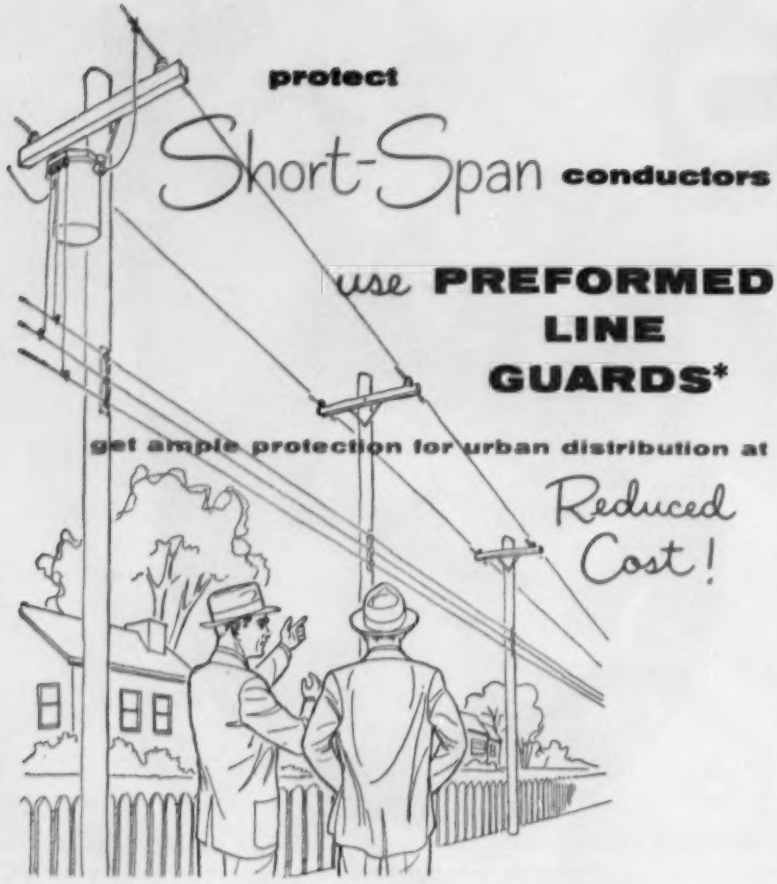
Together these two layers give 2+2 cable outstanding service reliability. Your Anaconda salesman or distributor has full details. Call him today. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

ANACONDA®
ALUMINUM AND COPPER WIRE AND CABLE

FASTEST WESTERN SERVICE — Anaconda's Western Distributors and expanded and modernized Orange, California mill which fabricates copper and aluminum wire and cable for *every kind of application* assure West fastest possible service on all needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle.

ANACONDA 2+2 TYPE N-SD CABLE: lightweight . . . sturdy . . . easy, fast to install . . . free-stripping, clean to handle . . . neat.





• Preformed Line Guards will save money on short-span urban distribution lines . . . whether ACSR, all-aluminum, or copper conductors are in use. Use them on all conductors where protection against vibration damage is not essential and standard Armor Rods may not be needed. Line Guards are smaller in diameter—fit insulator grooves of both old and new designs. Check P L P price lists. You will notice Line Guards are *lower* in price than Armor Rods . . . yet, Line Guards provide sufficient protection on short spans.

Line Guards . . . developed from Armor Rods—are used like Armor Rods . . . protecting conductors against arcover, chafing, and mechanical wear due to concentrated stresses on light or short-span construction.

Let your P L P Representative help you select the most economical P L P Product for your application. Write or call Cleveland: EX 1-3571.

**Made in accordance with or for use under one or more of the following U. S. Patents: 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.*

Pin Insulator
Line Guards should be used over the conductor where tie wires are applied . . . guard against tie-wire damage.
Line Post
Line Guards permit you to apply your ties as tightly as needed without fear of conductor damage.
Clamp Type
Line Guards fit snugly . . . cushion the conductor from clamp-pressure damage and concentrated stresses.

PREFORMED LINE PRODUCTS CO.
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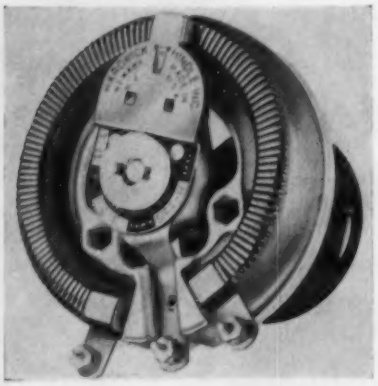


High-wattage Rheostats

(43) Hardwick, Hindle Inc., Newark 5, N. J.

Patented spring-type contact arms are a new feature of this company's rheostats. The new contact arm gives automatic adjustment of brush pressure over the entire contact area of the winding, according to reports. Available in wattages of 225, 300, 500, 750 or 1,000.

Air Conditioning Timer

(44) Telechron Timers & Motors, Ashland, Mass.

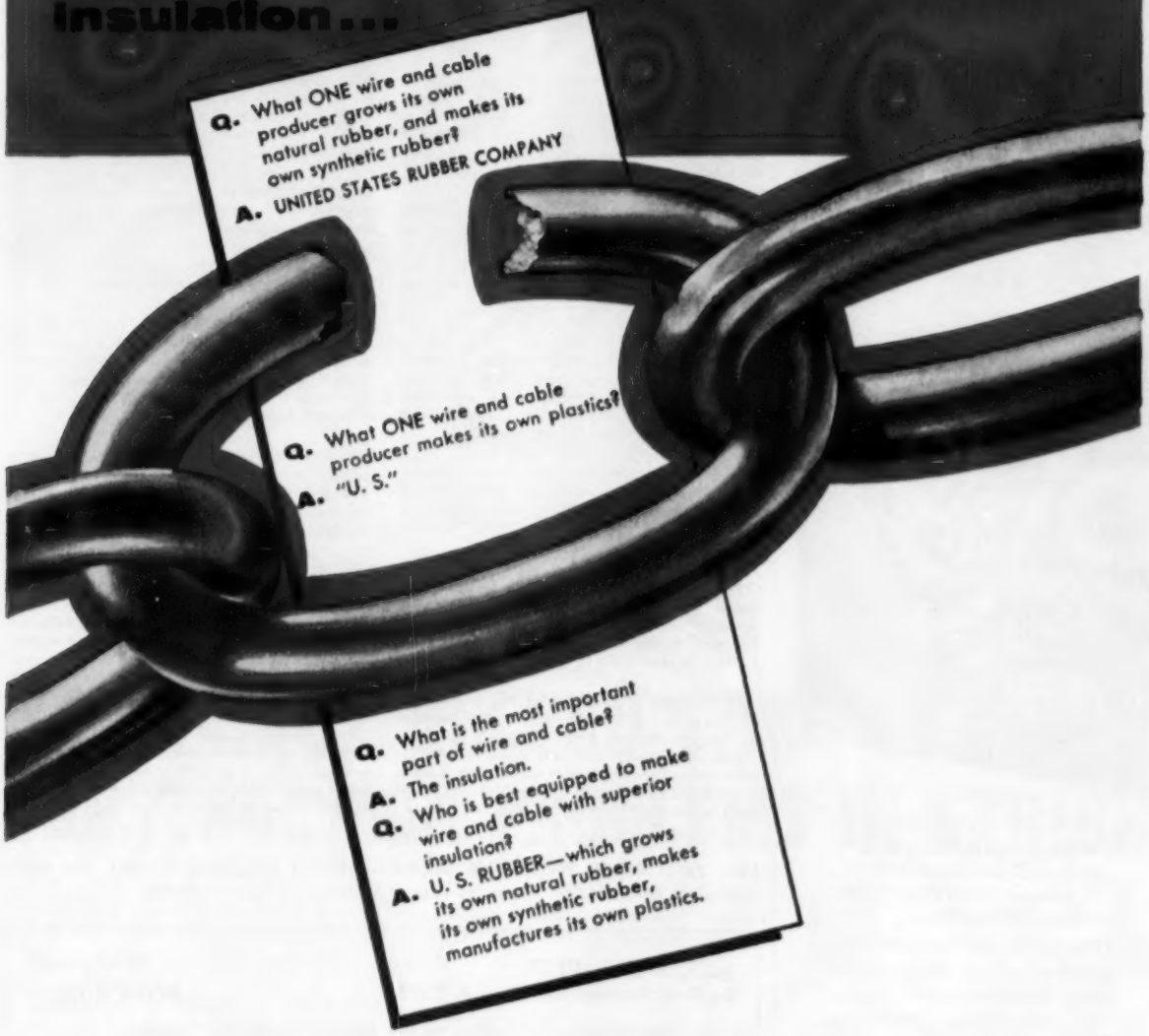
An air conditioning timer, fully automatic and designed to be used as an integral part of the unit, is being offered by this manufacturer. The timing unit incorporates a two-day skip feature and three ways of regulating an air conditioner, according to reports. It can be set for manual operation, automatic turn on and off regulation, or automatic one- or two-day skip.

(45) **DEVICES**—Designed for dryer installations, P & S 30-amp three-wire receptacles, caps and cord sets have L-shaped slots and blades. The line consists of No. 3836 black surface receptacle; (No. 3836-W, white) No. 3835 flush receptacle; No. 9331 plastic cap; Nos. 9337 and 9338 armored cord grip caps; No. 9339 rubber cord set in 36, 48 and 60 in. lengths. Both surface and flush receptacles have lay-in type pressure terminals. Made by Pass & Seymour Inc., Syracuse 9, N. Y.

(46) **TOOL**—An improved tool for ripping the outer covering of nonmetallic sheathed cable, including small type T, has been announced by Holub Industries Inc., Sycamore, Ill. The cable is slipped in, the handles are squeezed together. A pull cuts the sheathing as far as desired. Stamped holes in the handle measure wire sizes from No. 14 to 6. Catalog number is Hi-225.

(47) **REELS**—Compartmented reels are offered by Reel-O-Matic Corp. Division of Columbia Industries Inc., Columbia, Pa. Cable can be measured, coiled and cut to proper lengths for each compartment in the warehouse and the complete reel can be shipped to the job, the manufacturer points out. Reel capacity is 750 CML.

Electrical wire is no stronger than its insulation...


Q. What ONE wire and cable producer grows its own natural rubber, and makes its own synthetic rubber?
A. UNITED STATES RUBBER COMPANY
Q. What ONE wire and cable producer makes its own plastics?
A. "U. S."
Q. What is the most important part of wire and cable?
A. The insulation.
Q. Who is best equipped to make wire and cable with superior insulation?
A. U. S. RUBBER—which grows its own natural rubber, makes its own synthetic rubber, manufactures its own plastics.

ELECTRICAL INSULATION IS A "U. S." SPECIALTY!

Isn't it logical that a rubber company should make the best wire and cable insulation there is? U.S. Rubber has been a pioneer in insulation for close to 70 years—has amassed in that time a stockpile of research data and experience that can't be beat. Electrical insulation is a "U.S." specialty! Electrical insulation makes the difference between superior and ordinary wire and cable. Conductors of all manufacturers are standard, but insulation must be the best that science can produce. That's why your best bet in wire and cable is U.S. Rubber.

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ELECTRICAL WIRE & CABLE DEPARTMENT • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

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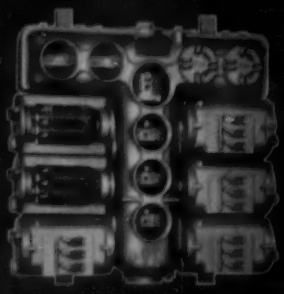
EXPLOSION-PROOF
CIRCUIT BREAKER PANELBOARDS



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Here is a new departure in cast aluminum circuit breaker panelboard design for hazardous locations. They are explosion-proof . . . dust-tight . . . weather-resistant. Triple sectioned joints in housing bodies provide quick access to and complete visibility of circuit breakers and factory sealed wiring. This means easier maintenance. Available for all wiring systems in 2 to 24 branch circuit types.
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BULLETINS ETC.

(48) UNIT SUBSTATIONS — Continental Electric Equipment Co., Box 1055, Cincinnati 1, Ohio, explains how compact, enclosureless packaged power at load centers effects installation and operating economies. Information in bulletin No. 102.

(49) FARM LIGHTING — A new farm-lighting booklet, Outdoor Lighting for Your Farm, has been announced by Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y. Circuits, power distribution centers, planning advice and other information are given.

(50) RLM SPECIFICATIONS—The 1955 edition of RLM Standard Specifications Book, dealing with both incandescent and fluorescent lighting units for industrial applications, is now available. Write to RLM Standards Institute, Suite 818, 326 W. Madison St., Chicago 6, Ill.

(51) COOLING TOWERS—Answers to 15 questions about their induced-draft cooling towers are published in a booklet available from J. F. Pritchard & Co. of California, 4625 Roanoke Parkway, Kansas City 12, Mo.

(52) CONDUCTOR ACCESSORIES GUIDE — "A Guide for the Selection of Electric Conductor Accessories" is a new manual available from Reynolds Metals Co., Cable Division PR, 2500 S. Third St., Louisville 1, Ky.

(53) NUCLEAR REACTOR CONTROL — Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa., is offering folder ND46-70-700(1) to explain the control channels comprising a reactor control system. It also outlines the design, instrumentation and fabrication of the company's "package" control systems.

(54) RUBBER-INSULATED CABLE — The Okonite Co. is offering a new booklet on rubber-insulated cable construction, for use where rigid conduit systems are unnecessary. Write to the company at Passaic, N.J.

(55) BASIC SWITCHES—Description of 10 classifications of the Micro Switch standard line is carried in catalog No. 62, now available. More than 400 listings of basic switches, auxiliary actuators and terminal enclosures are covered. Send requests to Micro Switch, Freeport, Ill.

(56) ELECTRICAL PRODUCTS — Adjustable and nonadjustable floor boxes, junction boxes and other electrical products and specialties of Fullman Mfg. Co., 1209 Jefferson St., Latrobe, Pa., are listed in a new catalog available. Ask for catalog No. 600.

(57) MOTOR CONTROLS—Publication of a new pocket catalog for electric motor controls is announced by Furnas Electric Co., 1082 McKee St., Batavia, Ill. Specifications, photos and prices are given. Identified as booklet 5411.

(58) HEAVY-DUTY TRUCKS — Three new brochures describing the company's 1955 series 100, 200 and 300 heavy-duty trucks have been published by the Four Wheel Drive Auto Co. Write to the company's sales promotion department, Clintonville, Wis.

(59) HYDRAULIC TURBINES — Baldwin-Lima-Hamilton Corp. illustrates its hydraulic-turbine research in a booklet available. Write to the company at Philadelphia 42, Pa. Approximate equations for a general guide in preliminary selection of turbine speeds and sizes are included in the information.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
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Not good after July 1

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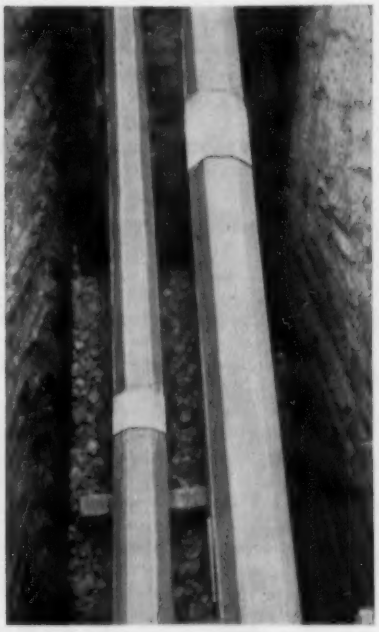
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Groundwater was a problem on this underground system . . .

Future roads made special reinforcing necessary . . .



Power and telephone circuits ran in the same trench . . . but

OCT-O-DUCT HELPED TAKE UNUSUAL CONSTRUCTION PROBLEMS IN STRIDE

The contractor on this underground job at a new college campus at Goleta, California, had plenty of construction problems.

Excessive groundwater made it necessary to pump many trenches, put a premium on fast duct erection and encasement.

Built to Last

A steel reinforcing web was devised to strengthen duct-beam where future roads would impose heavy loading.

Many thousand feet of OCT-O-DUCT were laid, combining 3-inch and 4-inch in the same trench to accommodate power and telephone circuits.

Does Job Best

The exclusive features of Soapstone OCT-O-DUCT helped make it possible to meet the rigid specifications called for on this job, despite problems encountered.

OCT-O-DUCT is designed to take complicated set-ups and unusual construction problems in stride. Flat sides, simple couplings and convenient length make it first choice with contractors and construction departments of power and telephone utilities, and industrials throughout the West.

Low Price

OCT-O-DUCT's low price and low installation cost, combined with its outstanding electrical, chemical and mechanical characteristics, give you your best buy in underground circuit protection. Try O C T - O - D U C T on your next underground job.

Write for specification bulletin bulletin 54A and for Installation Manual 54B.

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ELECTRA'S HUSBAND

Getting Someone Else To Pay For It

"NOW what are you growling about?" Electra asked one evening a few days before the mid-April deadline for filing the 1954 income tax returns. I had just crumpled another sheet of paper and thrown it at the wastepaper basket alongside the living room desk with a whispered oath that I hoped she had not heard.

"Have you ever tried to fill out Form 843 so as to get a small credit for foreign taxes deducted on dividends paid by a Canadian company?" I asked acidly. "Try it sometime for your disposition. Then decide whether you, or the guy who devised the form is a dunce."

"Why not skip the whole thing then?" she challenged. "Don't ask for the credit."

"Listen my dear, $13 is $13, especially when I'm already working almost two days out of every five for Uncle Sam," I said savagely.

"You ought to be glad that you can pay taxes," she placated in a deliberate move to calm me down.

"Well maybe I would if I had some say on how the money was going to be spent," I retorted petulantly. "If everybody who pays an appreciable slice of his or her income had an opportunity to indicate what the money was to be used for, a lot of silly government spending would stop. That might be a good way to cut government expenses."

"Now you're kidding yourself," she asserted argumentatively. "Spending would go up. More people would want the government to give them more things."

"That could be, but when the wishes of the majority were toted up, a lot of things for which federal money is being spent now wouldn't be on the list," I said as I threw all of the tax papers into a folder and closed the desk. "The country would get the essentials of good government without the nonsense and waste of bureaucracy. Perhaps also more people would do things for themselves."

"It's a good thing you stopped working on those tax papers," she commented facetiously. "I think it has made you just a bit nutty. I'm going to wash the dishes. Will you wipe them or do you intend to read?"

"I'll read," I said sagely.

The very first thing that came to hand out of the briefcase full of papers that I picked up was a booklet that bore on the subject we had been discussing. It was Raymond Moley's treatise on "What Price Federal Reclamation?"* In its very beginning Moley posed the question I had raised. How long would taxpayers in states like New York, Florida and Pennsylvania continue to put up billions of tax money for irrigation projects in the 17 arid Western states if they were aware of the real costs and questionable benefits of the whole federal reclamation program? Not long, that's for sure. This already seems apparent in the dim view that senators and representatives from these states are taking on appropriation bills to finance USBR undertakings.

Moley pointed out some facts which should give any taxpayer cause to wonder about the economics of the whole Reclamation Bureau program. For instance he showed that under the interest-free subsidy of the so-called "interest-component" device, one dollar of taxpayer investment in an original project becomes $4.21 of cost by the time the 50-year repayment period rolls around. He also showed that it actually would be less burdensome for the taxpayers if the farmers on the USBR projects would agree just to pay the interest on the federal investment whenever the repayment period extends beyond 40 years.

The extent of the subsidy on some of the present and proposed irrigation projects was estimated in Moley's study. They ranged from $32,000 for a 160-acre farm in California's Central Valley Project to $177,000 for a similar farm in the proposed central Arizona development and $212,000 for one in the proposed upper Colorado area. If the people in the great taxpaying states were cognizant of facts such as these, they certainly would importune their congressmen to call for a rationalization of the whole reclamation concept.

A similar rationalization of the program of subsidized federal power development could mean that congressmen from the states that do not directly benefit from such activities might take a dim view of further federal appropriations for power projects. Such a possibility accounts for the critical view some people take of the future power outlook for the Pacific Northwest under the program of federal beneficence and paternalism that has kept that area supplied with electric energy.

The federal taxpayers already have $1,586,200,000 invested in projects which furnish power to the Pacific Northwest. In addition to that the developments now under construction will require an estimated $897,600,000 to complete them. The federal treasury has been putting out about $100,000,000 a year for Columbia River power development. How much longer this will continue is a debatable matter.

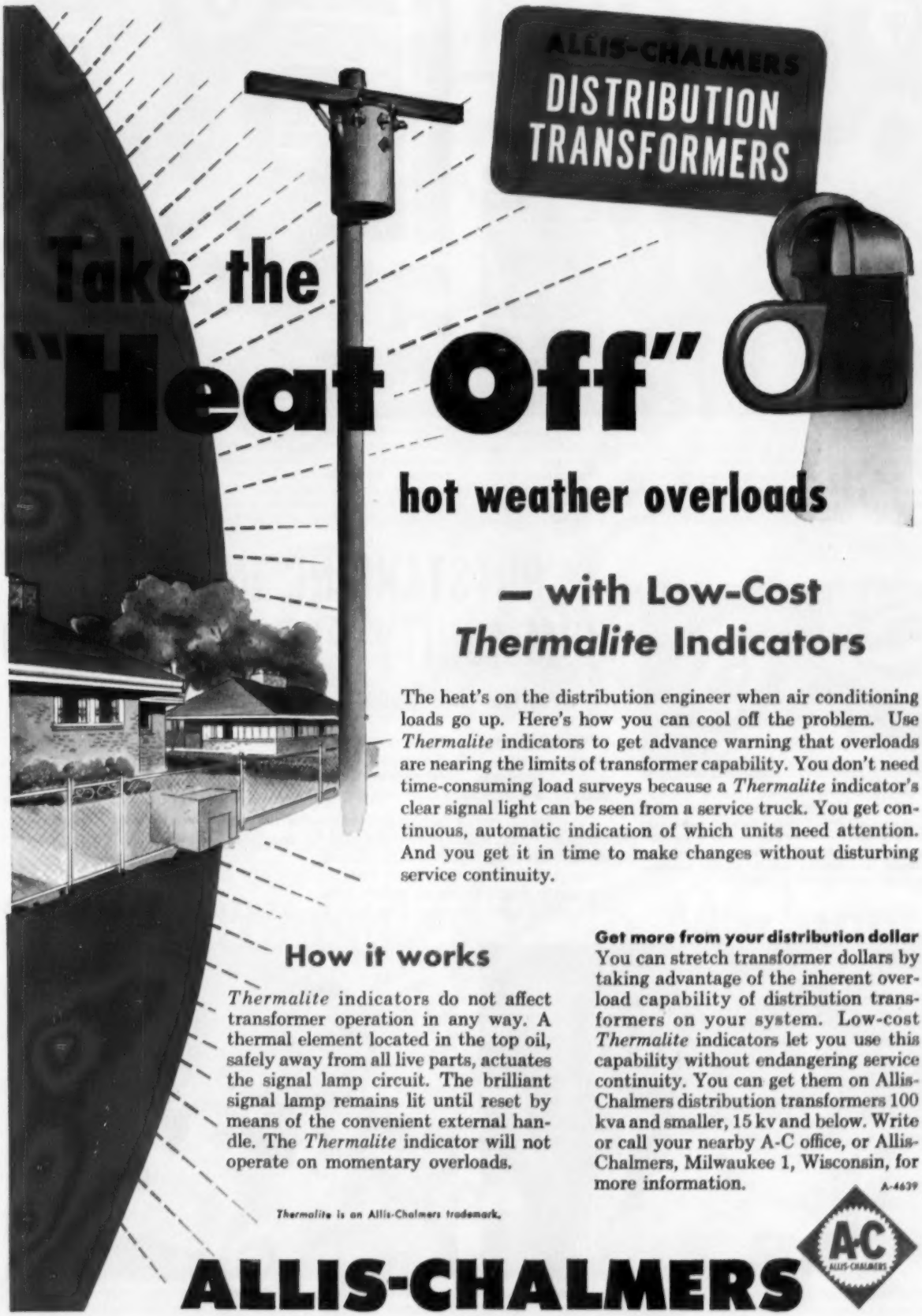
However, when the ultimate plans for Columbia power development by the federal government are considered, there is reason to doubt the continuation of federal handouts. Nine additional projects have been authorized but no funds have been appropriated for them. The estimated cost of these projects is $1,591,300,000. This means much more federal largesse than the region has enjoyed in the past.

Couple power and irrigation together and the future investment demands to be met by the taxpayers of all the states for the benefit of the people of just a few mount up to a staggering total. In the case of the Upper Colorado River project, small areas of four states would receive 100% of the benefits but would pay only 2% of the tax burden.

"Well what did you learn?" Electra demanded when she returned from washing the dishes. I told her about the Raymond Moley booklet and its conclusions.

"You and Mr. Moley are doing a lot of wishful thinking," she commented. "You confuse economics and politics. To politicians economics is interpreted their way and not your way. You just keep on paying taxes."

* No. 455 in the series "National Economic Problems" published by the American Enterprise Assn., Washington, D. C.



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— with Low-Cost *Thermalite* Indicators

The heat's on the distribution engineer when air conditioning loads go up. Here's how you can cool off the problem. Use *Thermalite* indicators to get advance warning that overloads are nearing the limits of transformer capability. You don't need time-consuming load surveys because a *Thermalite* indicator's clear signal light can be seen from a service truck. You get continuous, automatic indication of which units need attention. And you get it in time to make changes without disturbing service continuity.

How it works

Thermalite indicators do not affect transformer operation in any way. A thermal element located in the top oil, safely away from all live parts, actuates the signal lamp circuit. The brilliant signal lamp remains lit until reset by means of the convenient external handle. The *Thermalite* indicator will not operate on momentary overloads.

Get more from your distribution dollar

You can stretch transformer dollars by taking advantage of the inherent overload capability of distribution transformers on your system. Low-cost *Thermalite* indicators let you use this capability without endangering service continuity. You can get them on Allis-Chalmers distribution transformers 100 kva and smaller, 15 kv and below. Write or call your nearby A-C office, or Allis-Chalmers, Milwaukee 1, Wisconsin, for more information.

A-4639

Thermalite is an Allis-Chalmers trademark.

ALLIS-CHALMERS

TEXAS POWER & LIGHT was cited for contributions to industrial and agricultural development in its service area. Investigation of untapped natural resources led to new industry—typified by the new Alcoa reduction plant at Rockdale. Opening day ceremonies were attended by (L to R) J. D. Harper, works manager; Congressman Robert Poage; W. W. Lynch, President, Texas P&L; Governor Allan Shivers; T. D. Jolly, Alcoa Vice President; Lee E. Cook, Texas P&L Vice President; A. P. Hall, Alcoa Vice President.

PENNSYLVANIA POWER & LIGHT received recognition for outstanding contributions in aiding progress in all phases of sales promotion and business development. Highly successful co-ordination of the activities of manufacturers, distributors, and dealers of electrical farm equipment and machinery, plus the utilization of national publications, helped accelerate the application of electricity in a manner conducive to improving the economic welfare of customers and the entire Service Area.

FOUR CITATIONS SIGNED, Harold Quinton, President of the Edison Electric Institute and Southern California Edison Company (left) looks ahead to final award with Colonel H. S. Bennion, Managing Director of E. E. I. The Coffin Award for outstanding operating and community achievement will be presented on June 14.

OUTSTANDING INDUSTRY, COMMUNITY PROGRAMS CITED

as four electric utilities get Coffin Award nominations

"Telling the story of the American competitive system," "organization teamwork," "business development," "industrial and agricultural development."

These are the stories that are back of the nominations by E.E.I. of Arizona Public Service, Cleveland Electric Illuminating, Pennsylvania P&L, and Texas P&L for the highly prized Coffin Award for 1954. To each has gone a citation from E. E. I. commemorating these outstanding achievements. And to each, General Electric Company, donor of the award, extends its heartiest congratulations for a job well done. General Electric Company, Schenectady 5, N. Y. 301-293

MORE POWER TO AMERICA

GENERAL ELECTRIC

ARIZONA PUBLIC SERVICE was designated for a successful community approach to helping preserve the American democratic ideals of personal liberty and freedom by telling the story of the American competitive system in a way that won community-wide acceptance and praise.

THE CLEVELAND ELECTRIC ILLUMINATING was cited for successful organization teamwork techniques that led to cost reductions, improved public relations. Above, Mayor A. J. Celebrezze and C. E. I. Vice President R. M. Besse scan program at premiere of utility's movie, "Land of Promise."

ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S. VOL. 114 No. 5 MAY 1955

Control panels are inserted in 604 electronic calculating punch for automatic billing. The unit at right is for programming, that at left, for calculating. The hood over calculating unit is to exhaust the more than 19,000 Btu of heat created by 1,400 electronic tubes

For billing and accounting SMUD is finding

Economies With Machines

William J. Nolan
General Auditor
Sacramento Municipal Utility District

The large savings made possible by use of mechanical billing and electronic computing machines have made this subject one of the liveliest topics in the utility business today. This is the story of the complete mechanization of Sacramento Municipal Utility District's billing, collecting and accounting operations, and the cost savings apparent after nine months of service.

SMUD first installed accounting and billing equipment in 1946 when it began operation of the electric distribution system in California's capital city and surrounding area. Three years ago this equipment commenced to show the strains of overload from unprecedented customer growth and plant expansion. Rather than add equipment and personnel to alleviate this condition, it was decided to survey the offerings of the business machine manufacturers and to explore the possibilities of simplification and higher mechanization of all accounting and billing methods and procedures.

In undertaking this survey, well defined objectives were developed. They included: (1) continuance and improvement of good service to customers; (2) achievement of improved working conditions and methods for employees; and (3) lowering of operating costs.

Results of this survey showed that complete mechanization was the answer to the problem. There was no escape, of course, from two very natural objections to a change of this magnitude—first, the inertia that seems to legislate against almost any change and, second, the understandable concerns in regard to job security after the machines take over all of the work. This was combated by the close involvement at all levels of supervisors as well as individual employees and work

groups in planning new procedures and in forecasting the effects of new equipment and procedures on particular assignments. In this area of involvement, the objective was to introduce that ingredient so essential to a successful changeover from one system to another, teamwork and wholehearted acceptance by the work unit supervisors and their staffs of the new equipment and methods.

New Equipment

The conclusion of this work led to adoption of IBM punch card equipment and the application of mechanical procedures practically to all phases of billing and account functions. With the installation of the IBM equipment in July 1954, the district adopted the following mechanized procedures: (1) mark sense meter reading; (2) computation of residential, commercial, industrial and agricultural accounts by IBM 604 electronic calculating punch; (3) automatic posting of customer payments; (4) distribution of charges for pay rolls, transportation, materials and supplies issuance and accounts payable; (5) preparation of checks, both general and pay roll; (6) maintenance of unit property records for all electric plant, both mass units, inside and general plant; (7) preparation of operating and general ledgers and of various reports to management.

Savings Effected

Through introduction of this new equipment and the change of methods, the district expected to realize net savings in operating costs amounting to $26,000 annually. After nine months of operating experience under the new system, the district has been able gradually to reduce its accounting and billing staff by 12 people. The reduction was accomplished either by transfer to vacancies in other departments or by abolishment of positions when resignations occurred. Upon the adoption of IBM equipment, the machine rental increased approximately $12,000 per year above the rental of equipment previously used.

Net savings of this conversion is currently accruing at the rate of more than $38,000 annually, or 45% higher than the $26,000 originally estimated.

Credit for most of this saving in operating cost must be given to one machine, the 604 electronic calculating punch. With its wide flexibility of application and speed, the electronic calculating punch has permitted the district to mechanize not only the large volume accounting and billing operations but also the smaller jobs that previously required a high degree of clerical effort or multimachine operations to obtain the end result. In essence, this one machine has made automation possible at SMUD.

This 403 accounting machine has bill feed and comparing device for addressing and printing service bills and collection notices. If the sequence is wrong, machine stops process

As considerable interest has been shown in the new billing system, basic steps are outlined in the following paragraphs. Mechanized billing procedures are followed from the time meters are read to the time bills are paid.

Customer Accounting

Meter Reading—The customer accounting procedure begins with reading the meter. At SMUD the meter reader makes a few simple pencil marks on an IBM punched card to record the present meter reading. This is known as mark sense meter reading. In addition to the indicative information concerning the account, the mark sense meter reading card is designed to carry up to 10 consecutive meter readings, consisting of four readings of five positions each, marked on each side of the card, and two are punched into the card. Thus the card serves as a chronological history record.

This card offers a number of significant advantages as it eliminates: (1) meter books and cost of maintaining them; (2) errors from illegible figures; (3) inaccurate manual transcriptions; (4) subtraction errors; (5) manual punching or reading; and (6) permits reading of meters in any sequence.

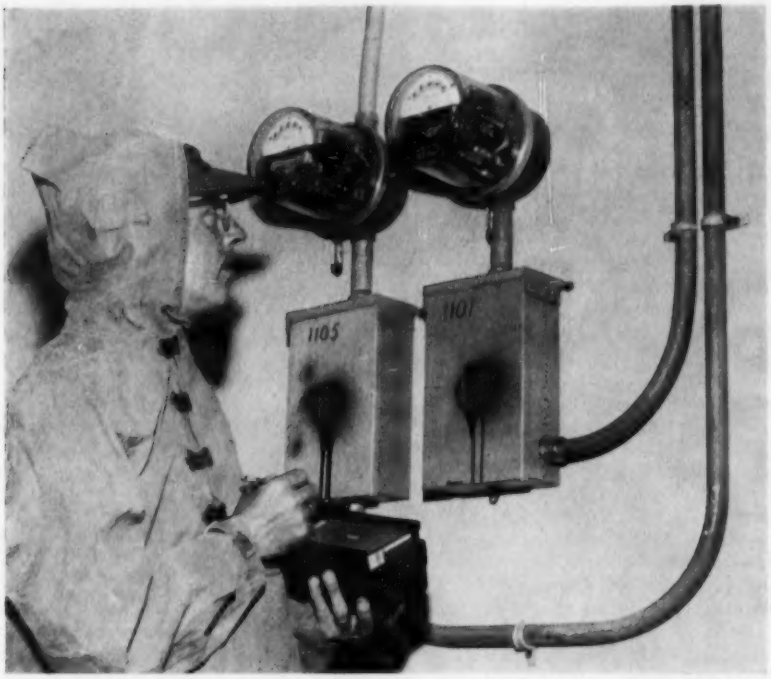
The source for kilowatt-hour consumption figures is a punched card upon which the meter readings are marked in pencil. Following the preparation of the meter reading card, the system is fully automatic.

The marked readings are automatically read and punched into the billing cards at speeds up to 6,000 cards an hour. Experience indicates that less than 1% of the billing cards are flagged because of poor marks. This billing card prepares the revenue report, rate statistics, billing register, revenue control, punched card service bill, and finally becomes the current entry to the open item accounts receivable ledger.

The 604 Electronic Calculating Punch—The IBM 604 machine plays an important part in these processes.

Four domestic rates, comprising 85% of the accounts, are processed twice through the 604 at 6,000 cards an hour in random sequence. During these passes, the machine (1) determines the kwh consumption; (2) applies the meter constant; (3) considers meter turns for four- and five-dial meters; (4) calculates total kwh for combined meters; (5) checks consumption against high and low limits and punches a designation of accounts outside the limits; (6) calculates the amount of the bill; (7) punches consumption and amount of the bill in the billing card; (8) checks the cross footing, application of the constant and computation of the bill amount.

In three passes the 604 performs the same functions for seasonal agricul-



Mark sense cards are protected during rainy weather by box, which is inverted between meters to keep them dry; allows only reading section and ends to be exposed at any time

tural rate and determines the accumulated year-to-date figures.

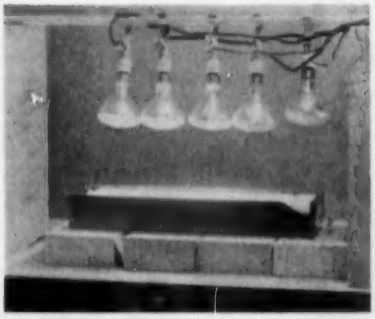
Monthly ratchet demand rates are also placed on the electronic calcuating punch. The demand reading is marked by the meter reader on a separate demand meter reading card at the time he obtains the kwh reading. This demand reading is mark sense punched into a demand history card. From the demand history card and the billing card containing the kwh reading, the 604 machine (1) computes the kw demand; (2) determines the high demand of the current and preceding 11 months; (3) computes the demand charge; (4) determines whether the minimum charge applies; (5) computes kwh consumption; (6) computes the kwh charge; (7) combines the demand and energy charges for the total bill amount; (8) punches the kwh consumption, kw demand and total charge in the billing card; and (9) checks all of the foregoing calculations.

Following the computation of the bill amount, the billing cards prepare revenue and rate statistics, create revenue controls and are balanced to folio controls. The billing cards are then machine sorted by account number and are associated with the arrears cards to produce the billing register and the punched card service bill.

The Punched Card Bill—The bill is an IBM punched card of postcard stock. A number of important advantages are obtained from its use. The bill is punched with account number, date, rate, mail code and the total amount of the bill. During the printing operation the account number punched in the bill is electrically compared with the account number of the billing, arrears and the name and address cards. This comparison, performed by the IBM comparing bill feed machine affixed to the 403 tabulator, guarantees that the cards used to print the address and billing sides of the service bill are for the same customer.

When payments are made, the punched cashier's stubs become the automatic input for the cash balancing and posting procedures. These stubs are reproduced into payment cards (standard IBM cards) at 6,000 an hour. These cards are listed at 9,000 an hour to prepare a cash batch proof list. This list is balanced to the teller's cash. Partial payments are handled automatically, too, as the remittance amount is recorded on the reverse side of the stub with pencil marks that are read and punched into the payment card. It is unnecessary to sort manually the cashier's stubs because the payment cards are mechanically sorted to account number sequence. While the payment cards are preparing the cash reconciliation report, cash control entries are automatically summarized.

Following the distribution of cash, the next big advantage is the machine posting of cash to the accounts receivable file. Every other day all fully paid accounts are pulled by IBM collator from the accounts receivable ledger



If cards get too wet for processing they are dried overnight under infrared lamps

and simultaneously filed in partial payments in the form of credit entries. With this single pass through the collator at a speed up to 240 items a minute, the ledger is current. The pulled fully paid accounts are balanced to the payment cards and filed pending preparation of the paid register.

In addition, the punched card accounts receivable is used to ledger prepare six additional punched card documents when necessary. They are: (1) open ledger reminder notice; (2) open ledger turn off notice; (3) open ledger turn off order; (4) final bill; (5) final bill ledger reminder notice; and (6) final bill ledger final notice.

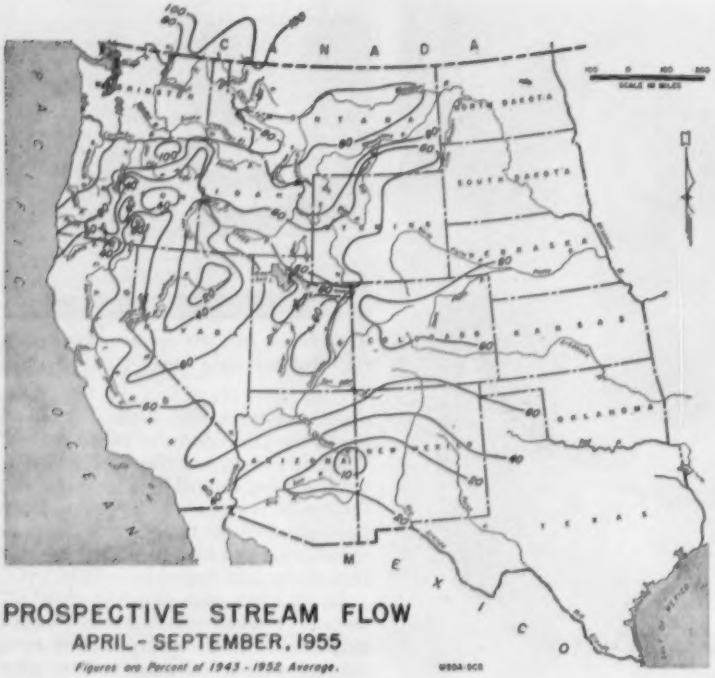
The ledger is searched automatically for those accounts that fit a collection formula set up by the commercial department. Only the cards for these accounts are used to prepare the open ledger notices. If the customer pays his bill and returns the postcard stub of one of the above notices, cash is posted automatically as described earlier.

All adjusting entries to the accounts receivable ledger are recorded on punched cards and filed in the accounts receivable ledger. At the next billing point the punched card ledger is used to prepare the aged cycle balance, which is balanced to the mechanical accounts receivable control. The control is created as a by-product of the billing, cash reconciliation and miscellaneous entry procedures.

At this point the cycle is complete. The customer accounting routine begins again for another two months with the marking of the present reading on the mark sense meter reading card, which is also the only phase completely susceptible to human error.

Economy

Economy of SMUD's machine billing and accounting is achieved by a high load factor on the rented machines. Also important is the integration of both billing and accounting. Machine billing alone would not support the cost of rentals.



SURVEYOR CREWS cover snow courses to get runoff data for Soil Conservation Service reports

Water in Short Supply for Some Areas

Homer J. Stockwell
Hydraulic Engineer

Gregory L. Pearson
Hydraulic Engineer
Soil Conservation Service

Streamflow from snow melt will be less than average in the major river systems of the Western United States during 1955. Runoff barely normal is expected in the extreme north and northwest. The decline in water supply outlook is gradual toward the south. In Arizona, New Mexico, southern Utah, large parts of Nevada and localized spots in California extremely short water supply is in prospect. This is the summary of water supply conditions as prepared by the U. S. Soil Conservation Service and is based on April 1, 1955, observations at some 1,200 snow courses in the high mountains of the West.*

This analysis of April 1 snow surveys, reservoir storage, soil moisture and other factors affecting this year's water supply, again presented by ELECTRICAL WEST, shows that runoff in prospect for irrigation, power generation and municipal and industrial use will be adequate in some areas of the Northwest, but will result in mild to severe water shortages elsewhere in the Western United States.

For the past five years an interesting pattern of areal distribution of snow cover and runoff has persisted over the mountainous areas of the West. The Columbia Basin on the north and northwest has had consistently higher snow cover and resulting streamflow in relation to normal than the drought areas of the south and southeast. This pattern has continued so long that the long-term water supply outlook in New Mexico, Arizona and parts of Colorado, Utah and Nevada has become increasingly poor.

Reservoir storage has continued to decline, pumping of underground supplies has been increased and, where no other alternative was available, crop acreage has been reduced and municipal supplies have been rationed. In much of the southern portions of the West it is estimated that streamflow is as low and the general water supply outlook as poor as at any time in the past 50 years. In the meantime demands for water have multiplied several times in that period.

Storage in the irrigation reservoirs of the West as of April 1, 1955, is consistently below the 10-year average for the years 1943-52. Extreme shortage in reservoir storage exists in Arizona, New Mexico, Colorado, Wyoming and Oklahoma. In the other Western states material shortages are also reported, particularly in the smaller irrigation reservoirs. These shortages will have an adverse effect on total water supply this year in most irrigated districts, especially where less than normal streamflow is expected. With another year of heavy depletion of reservoired water supplies in prospect, it is evident that next year's snow pack must be very heavy if continued critical water shortages are to be avoided in 1956.

The water shortage on the Rio Grande drainage continues to be critical with a combination of low reservoir storage and anticipated stream-

* The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Forest Service, other federal bureaus, various departments of the several states, irrigation districts, power companies and others. The California State Division of Water Resources, which conducts snow surveys in that state, contributed the California figures appearing in this article. The Water Rights Branch, British Columbia Department of Lands and Forests has charge of the snow surveys in that province and likewise contributed the information here for British Columbia. The U. S. Weather Bureau makes Water Supply Forecasts at numerous gazing stations, such forecasts being estimated principally on the basis of measurement of precipitation. The Weather Bureau forecasts are for the water year (October-September inclusive), whereas snow survey forecasts are for the irrigation season.

flow. Practically all 1955 water supply will be from underground sources. Spring runoff in the Salt River Valley of Arizona is nearly over with the lowest flow since 1904. The Salt River project has less water in storage than a year ago but the amount now stored is adequate for demands this year. Elsewhere in Arizona the outlook is extremely poor with no improvement in prospect. Snow melt season runoff is expected to be near normal in northern Utah but deficient in the southern portion of the state. Storage is very low in the small irrigation reservoirs, but near average in the larger ones. Water supply in Nevada will be short this year with low snow cover and substantially below average reservoir storage. The snow pack in California is 40 to 60% of normal in the Cascade Mountains and Sierra Nevada and conservation reservoir storage is 60% of the past 10-year April 1 average.

In Colorado and Wyoming the 1955 streamflow will be generally near three-fourths of normal. Storage in irrigation and power reservoirs is about one-half of the past 10-year average. Except for small irrigated areas, which divert their water directly from the main streams of the Colorado River drainage, there will be some water shortages. In highly developed irrigated areas east of the Continental Divide these shortages will be severe.

Short water supplies will be general in eastern and southern Oregon and southern Idaho, especially on the smaller streams and where substantial storage is not available. Storage on the Boise and Payette Rivers will provide sufficient water for irrigation this year. Streamflow in northern Idaho and northern Oregon as well as in Washington and Montana will be somewhat below normal but severe water shortages in this general area are not expected. Reservoir storage in the Columbia is down substantially from a year ago and is much below the past 10-year average.

The following forecasts of streamflow for the major rivers of the West for the April-September 1955 period will indicate general watershed conditions at the start of the snow melt season: for the Columbia River at The Dalles 82% of normal: Colorado River near Grand Canyon 69%; upper Missouri and its tributaries will average about 80%: Platte River and tributaries about 75%: the Rio Grande about 40% and California 60%.

In the following paragraphs the water supply outlook is briefly reviewed state by state. A chart showing current status of reservoir storage and a map showing the approximate runoff forecast for each area summarizes the status of water supply for the coming season.

Arizona—Arizona snow melt runoff may prove the least since 1904 and possibly the least since records began. Precipitation on the headwaters of Arizona rivers was exceptionally light last summer and fall, while temperatures were considerably above normal. The soils were extremely dry at the start of the winter. Sparse winter snowfall contained insufficient water to offset the accumulated moisture deficiency. As a result practically all of the snow water was absorbed by the dry mountain soils without producing much runoff. Snow has already melted without perceptible increases in the minimum flows of the rivers.

Water carry over in reservoirs of the Salt River project is substantial and will be adequate to meet needs this year. However, the San Carlos project has a continued shortage of stored water, with less than 20,000 acre-ft, or about 13% of the 10-year average, now in storage. Lyman Reservoir on the Little Colorado River stores less than 2,000 acre-ft, only 7% of its capacity, and with little prospects of any substantial improvement. Lake Mead stores less water now than at any time since initial filling was complete.

British Columbia—According to the British Columbia Water Rights Branch, most snow courses in the Columbia, Kootenay, Similkameen and Skagit River basins in British Columbia have snow water contents that are near normal. Observers in these areas report the ground is damp under the snow with the exception of the most northerly courses. Thawing appears to have started over most of the southern areas.

The April to September streamflow in these areas is predicted to be near normal. Unless exceptionally high temperatures occur, damaging floods are not foreseen.

Snow packs in the Okanagan are also near normal, but runoff is forecast about 80% normal. Water users in this area can anticipate adequate water supplies.

California—Water conditions in California as of April 1, as reported by the State Division of Water Resources, are generally unsatisfactory and indicate that the water supply for 1955 will be much below average. However, critical conditions are anticipated only in localized areas where development of conservation storage and groundwater basins have not kept pace with growth. With the present high degree of integration of major hydro and steam-electric plants throughout the state, there are no indications that the deficiencies in surface water supply will adversely affect power output.

There were no storms of consequence during March. From the standpoint of precipitation to date, this year appears to be the driest since 1947. If the near-drouth conditions should continue through another season, as has happened in the past, water conditions would become acute in many areas.

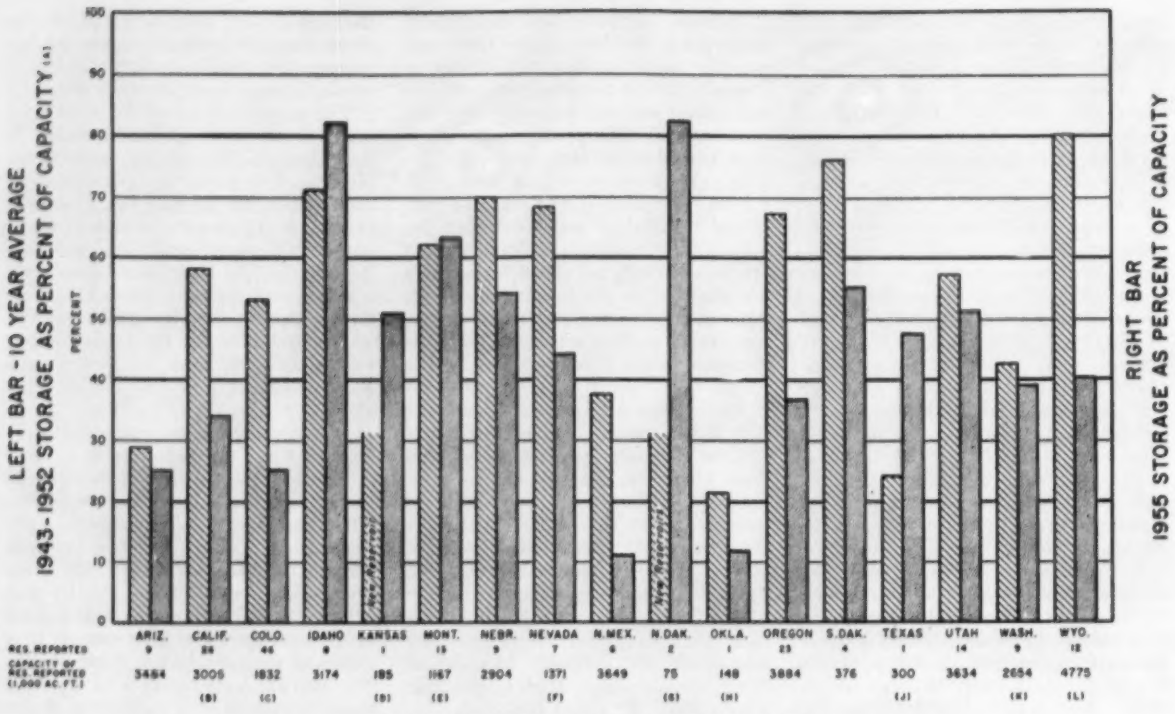
The water content of the snow pack varies from 40 to 60% of average in the Cascade Mountains and Sierra Nevada. The snow pack is generally about the same as that for March 1, except at the lower elevations where considerable snow melt occurred during March. The anticipated snow melt season runoff, assuming normal precipitation during the April-June period, is expected to be less than that for any year since 1947 and the flow of the Kern River may be the lowest since 1934.

Major conservation reservoirs serving areas in California had in storage on April 1 about 44% of their total capacity, which is approximately 5,800,000 acre-ft less than one year ago, the major portion of this decrease being in Lake Mead. Storage in intrastate reservoirs is about 72% of the 10-year average. As a result of the anticipated below average snow melt runoff, it is expected that the heavy draft on the low storage reservoirs will deplete many reservoirs prior to the end of the irrigation season.

Subnormal runoff has provided inadequate replenishment to groundwater basins in California. Deficient precipitation during February and March resulted in preseason pumping in many areas and below average surface supplies will undoubtedly require above average pumping in many areas during the latter part of the 1955 irrigation season. As a result, the water levels in most major groundwater basins will be considerably lower at the end of the 1955 irrigation season than in the fall of 1954.

Colorado—Summer discharge of all streams originating in the mountains of Colorado will be less than normal in 1955 but will exceed 1954 on all streams except the Rio Grande. The water supply in 1954 was near the lowest of record in practically all areas of the state. Because of low carry over in small irrigation reservoirs the statewide water supply outlook for 1955 is not much better than it was last year. The lack of storage will cancel the expected increase in streamflow over 1954. Users should be prepared to reduce their demands for water.

Forecasts of flow for the North and South Platte and Arkansas Rivers and their tributaries are for about 75% normal for the April-September 1955 period. On the Colorado River drainage forecasts range from nearly 90% of normal on the Upper Colorado, Yampa and White Rivers to 65 to 70% on the San Juan River and its tributaries in southwestern Colorado. The water supply outlook is fair to good


LEFT BAR - 10 YEAR AVERAGE
1943-1952 STORAGE AS PERCENT OF CAPACITY (a)
PERCENT
RIGHT BAR
1955 STORAGE AS PERCENT OF CAPACITY
100
90
80
70
60
50
40
30
20
10
0
ARIZ. CALIF. COLO. IDAHO KANSAS MONT. NEBR. NEVADA N.MEX. N.DAK. OKLA. OREGON S.DAK. TEXAS UTAH WASH. WYO.
RES. REPORTED 9 25 45 9 1 15 9 7 6 2 1 23 4 1 14 9 12
CAPACITY OF RES. REPORTED (1,000 AC. FT.) 3484 3005 (b) 1832 (c) 3174 185 (d) 1167 (e) 2904 1371 (f) 3649 75 (g) 148 (h) 3884 376 300 (j) 3634 2654 (k) 4775 (l)

RESERVOIR STORAGE AS OF APRIL 1, 1955

Explanation: (a) Most state averages for reported reservoirs are for a full 10-year period but in a few cases reservoirs with shorter records have been included; (b) Does not include Shasta, Millerton, Isabella, Folsom or Pine Flat reservoirs (combined capacity 7,992,000 acre-ft), April 1 combined storage 3,960,000 acre-ft; (c) Does not include John Martin reservoir on the Arkansas River (capacity 655,000 acre-ft), April 1 storage 1,300 acre-ft, or Granby, Horsetooth and Carter Lake on Colorado-Big Thompson project (combined usable capacity about 700,000 acre-ft), April 1 storage about 228,000 acre-ft; (d) Cedar Bluffs reservoir only; (e) Does not include Fort Peck reservoir (capacity 19,000,000 acre-ft), April 1 storage 9,326,000 acre-ft, or Flathead Lake (capacity 1,791,000 acre-ft), April 1 storage 710,000 acre-ft, or Hungry Horse reservoir (capacity 3,500,000 acre-ft), April 1 storage 2,155,-000 acre-ft; (f) Does not include Lake Mead (capacity 27,217,000 acre-ft), April 1 storage about 11,500,000 acre-ft; (g) Heart Butte and Dickinson reservoirs; (h) W. C. Austin reservoir (new in 1945); (j) Red Bluff reservoir on Pecos River, Lake Travis and Buchanan reservoir (combined capacity 2,844,000 acre-ft), April 1 storage 1,612,000 acre-ft; (k) Irrigation reservoirs only, does not include Roosevelt Lake (capacity 5,072,-000 acre-ft), April 1 storage 749,000 acre-ft, or Grand Coulee equalizer (capacity 761,800 acre-ft), April 1 storage 452,000 acre-ft; (l) Does not include Boysen Dam (capacity 758,000 acre-ft), April 1 storage 269,000 acre-ft

and much better than a year ago in the west slope.

Water available for irrigation in San Luis Valley along the Rio Grande will probably be less than in 1954. Forecasts range from 50 to 60% of normal. Snow melt runoff will be insufficient to meet all demands.

Soil moisture conditions in both valley and mountain areas are poor in eastern Colorado and fair to good on the west slope.

Idaho—The water supply outlook for streams in northern Idaho is near normal for 1955. The southern half has a poor water supply in prospect except along the main stem of the Snake River. Significant increases in the snow pack occurred during March in the north of the state but very little change took place in the southern portion where shortage is most critical.

Furthermore, watershed soils are dry and will take up more than the usual amount of snow melt before runoff starts.

Critical water shortages are developing in irrigated areas served by the Big and Little Lost Rivers, the Big and Little Wood River, Salmon Falls Creek and the Owyhee River. Carry-over storage and the snow pack are very low in respect to normal. The Boise and Payette Rivers have one of the lightest snow packs in years, but reservoir storage will provide adequate irrigation water for this year on those two rivers. Carry-over storage next fall will not be adequate for 1956.

Kansas — With no water stored in John Martin and the Great Plains reservoirs in eastern Colorado, water available for irrigation along the Arkansas River in western Kansas will be much less than normal. Only rainfall of high proportions in the Arkansas Valley can improve the situation. Storage in Cedar Bluff reservoir on the Kansas River watershed is now 94,000 acre-ft as compared to 185,000 acre-ft of irrigation storage capacity.

Montana — The snow pack on the Rocky Mountains feeding the upper Missouri and upper Columbia Rivers in Montana is 20% short of the average. Early runoff is expected.

The April-September flow into Fort Peck reservoir on the Missouri River will be 3,756,000 acre-ft, or 77% average. The Yellowstone River at Corwin Springs, Mont., should produce 1,714,-000 acre-ft or 85% average stream flow for the April-September 1955 period.

On the Columbia River drainage, the Flathead River at Columbia Falls, Mont., is forecast to flow 5,152,000 acre-ft of water between April 1 and Sept. 30, or 85% average. The April-September inflow to Hungry Horse reservoir on the south fork of the Flathead River is forecast to be 1,850,000 acre-ft, or 82% average. The Clark Fork River should produce approximately 11,000,000 acre-ft of water at the Montana-Idaho boundary during April-September, 81% average.

Nebraska—Western Nebraska areas along the North Platte will be limited to sharing 75% normal runoff into Wyoming reservoirs on this stream. Shortages of irrigation water seem virtually certain. Adequate water supply will be available only if rainfall during the summer months is well above average. Storage in Kingsley and Sutherland reservoirs is 90% of average for April 1, enough to meet normal requirements for the Tri-County irrigated area. Soils in irrigated areas are dry and streamflow is below average.

Nevada—Snow stored water ranges are from near normal in a small part of eastern Nevada to poor in the re-

mainder of the state. Reports on streamflow show that winter flow was below normal for all streams. Ground water levels in most valleys are the lowest since records were started. Storage in irrigation reservoirs on April 1 was 44% of capacity and only 67% of the 1943-52 10-year average. Water supply this year will be below normal in all parts of the state.

The Humboldt River at Palisades is forecast to flow only 17% of normal. Streamflow from the east central portion of the Sierras will range from 50 to 70% of normal.

Snow cover in the Spring Mountains in southern Nevada is 67% normal.

New Mexico — The water supply outlook along the Rio Grande in New Mexico is the poorest in recent years. Streamflow is expected to be even less than a year ago. Streamflow and water in storage together will supply only a small fraction of the usual water demand. Most of the water supply will have to come from underground sources. Storage in El Vado, Elephant Butte and Caballo reservoirs is about the same as a year ago, totaling approximately 160,000 acre-ft. Soils in all irrigated areas are dry and current streamflow is much below average.

The outlook for the irrigated area near Carlsbad is good. The flood on the Pecos River last fall filled these reservoirs. Storage is now twice the 10-year average and three times that of April 1, 1954.

Since storage in Conchas reservoir is below normal and slightly below a year ago there will be a shortage of water for the Tucumcari project. Inflow from snow melt will be negligible.

North Dakota — The water supply to irrigated areas along the Missouri River near Williston is good. Storage in Heart Butte and Dickinson reservoirs is now standing at 82% of capacity. Recent snows have improved soil moisture conditions.

Oklahoma—Storage in W. C. Austin reservoir on the Lugert-Altus Irrigation District is about 12% of capacity and near one-half of average.

Oregon — Farmers, ranchers and other water users can expect only poor to fair water supplies this year as a result of greatly deficient fall and winter precipitation and below average snow accumulation on watersheds.

Abnormally heavy storms in March have increased the snow pack to 90% of average. However, exceptionally dry soils on mountain watersheds will soak up much snow-melt water that would otherwise contribute directly to streamflow.

Stored water is about half of the 10-year average and about two-thirds of that of a year ago. Fourteen out of 26 reporting reservoirs are less than half full. Even so, stored water will "save the day" in many eastern areas of the state.

Seasonal streamflow will fall below average throughout Oregon except in the Umatilla Basin and the Clackamas, Santiam and McKenzie Rivers where flow just slightly above average is forecast.

Water supplies will be generally short in Harney Basin, Sprague, Silver Lake, Chewaucan, Guano Lake, Catlow Valley, Alvord Lake, Crooked, Owyhee, Malheur, Burnt, Powder, Pine, Imnaha, Grand Ronde, John Day and Rogue River basins except where stored water is available to alleviate the shortage.

The main stem of the Columbia River, as measured along the Oregon-Washington boundary at The Dalles, is forecast to flow less than in any of the past 10 years.

South Dakota — Runoff into reservoirs in and near the Black Hills should be slightly above normal in 1955. Total storage is about three-quarters of the past 10-year average. There will be some shortage in water supply for the Belle Fourche project.

Texas—Irrigation water will be extremely short in the El Paso area of west Texas, which depends primarily on storage in Elephant Butte reservoir. This area has suffered from water shortage for several years and 1955 will not be an exception. There will probably be less water available than in 1954. On the Pecos River below Red Bluff reservoir the outlook is good. The flood on the Pecos River in New Mexico last fall also filled this reservoir. Pump-irrigated areas on the high plains in northwest Texas have extremely dry soils because of drouth conditions of the past several months.

On the Colorado River in Texas, storage is near average in Buchanan and Lake Travis reservoirs.

Utah—Heavy storms during March at the higher elevations in northern Utah improved the prospective water supply outlook from what was beginning to shape up as a near record low year, particularly for late season supplies. The outlook is now fair to good. An exception where poor conditions still exist is in the Bear River drainage from south of Bear Lake in Utah to the Grace-Soda Springs area in Idaho. The Bear River at Harer is forecast at 51% of average. A small area along the Wasatch Front in the Ogden-Farmington area is also confronted with deficient water supplies.

With minor exceptions, central and southern Utah can expect a deficient water supply which can become quite critical along the Sevier River if the spring months are dry.

Because of dry soils underlying the snow pack in many parts of the state, and very low winter streamflow as a carry over from last year's drought, a greater than usual amount of the snow pack will be needed to saturate the watersheds before runoff begins. Storage in 14 reporting reservoirs is 78% of last year, 90% of average and 51% of capacity.

Washington—The snow pack in the State of Washington and on the headwaters of streams originating in adjacent states is 91% of normal as of April 1. This represents an increase of 18% since March 1. Spring precipitation has been unusually heavy. Lack of fall precipitation and resulting dry soil moisture conditions in the mountains are expected to further reduce this summer's runoff. Forecasts for the April-September period range from 80 to 95% of normal.

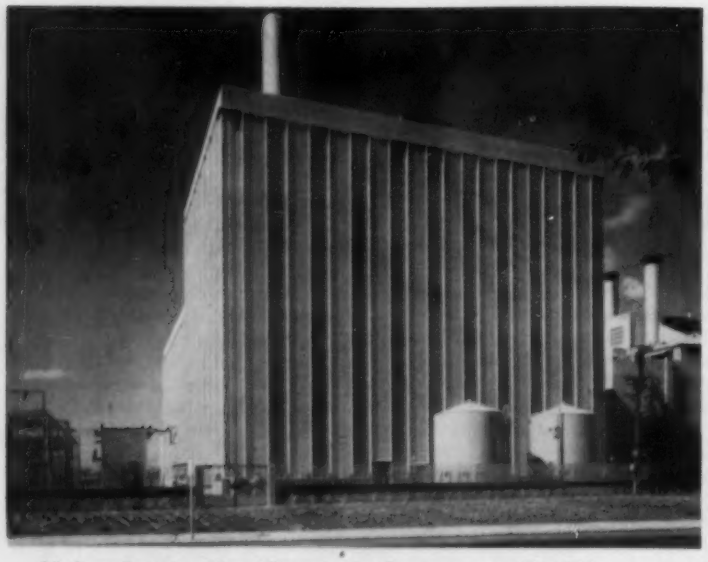
All irrigation reservoirs have excellent carry-over storage. The five Yakima River reservoirs hold 76% of their capacity. The average carry-over storage for the past 10 years is 65% of capacity. Storage in the three main power reservoirs in eastern Washington and northern Idaho are all considered below normal. Franklin D. Roosevelt Lake, Lake Chelan and Coeur d'Alene Lake have 14% of capacity in storage, compared with nearly 70% for the past few years.

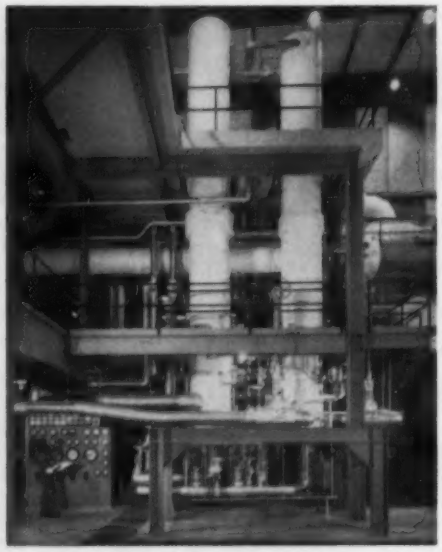
Nine irrigation reservoirs with a total capacity of 2,654,000 acre-ft now have 1,039,000 acre-ft in storage, which is slightly less than for the April 1 average of the past 10 years.

Wyoming—Snow cover is 20% below normal for the state as a whole. The snow pack is slightly higher in the northern portion than in the south. Soil moisture under the mountain snow is somewhat below normal. Since this moisture must be replaced by snow melt before runoff occurs, forecasts of streamflow are 5 to 20% lower than the per cent of snow cover would indicate.

Storage in all reservoirs is only 40% of capacity and 50% of the past 10-year average. Shortages are most critical in the North Platte and Laramie watersheds. Most of the 950,000 acre-ft stored in North Platte reservoirs is assigned to the new Alcova project and is not available for the North Platte irrigated district in eastern Wyoming and western Nebraska. Summer rainfall will have to be well above normal, if shortages are to be avoided. The outlook is similar to that of 1954. The Wheatland district has no carry-over irrigation water.

Water for irrigation along the main streams in northern Wyoming should be adequate in 1955. Water supply outlook on the east side of the Bighorn Mountains is substantially improved as the result of an unusually heavy snowstorm the first of April.





Modern plant gives Honolulu more capacity now; eventually will house a second unit. In designing it, Hawaiian Electric was . . .

Building Today for Tomorrow's Needs

L. W. Lengnick
Vice-president and Executive Engineer
Hawaiian Electric Co. Ltd.

W. H. Ness
Project Engineer, Power Division
Bechtel Corp.

"Building Today for Tomorrow's Needs." That is the slogan used by the Hawaiian Electric Co. Ltd., apropos of Honolulu No. 8, a new 50,000-kw turbine-generator placed in operation in December 1954, on an advanced schedule and officially dedicated March 4, 1955.

The new plant is an architecturally imposing structure located near the waterfront in downtown Honolulu adjacent to an older plant. Provision for a future second unit of the same size has been made in construction of the building, switchyard, circulating water system, fuel oil system and other facilities. Addition of unit No. 8, the largest on the system, brings the utility's total generating capacity to 275,000 kw to serve an island load that has increased at an average annual rate of 7.7% during the past six years.

In general, the plant follows established practices for modern steam plants, with some new equipment and features. The unit plan was followed using one boiler, one turbine-generator and one step-up transformer bank with high-voltage circuit breakers. The building of steel frame and reinforced concrete construction is founded on Raymond concrete piles driven to the underlying coral strata. The building, which houses both turbine and boiler equipment, is of adequate size for a duplicate unit. The walls are formed by alternate panels of concrete and fixed aluminum louvers with a baked enamel finish. Use of the louvers provides excellent ventilation, requires minimum maintenance and provides a very attractive appearance in keeping with the downtown location.

Plant Features

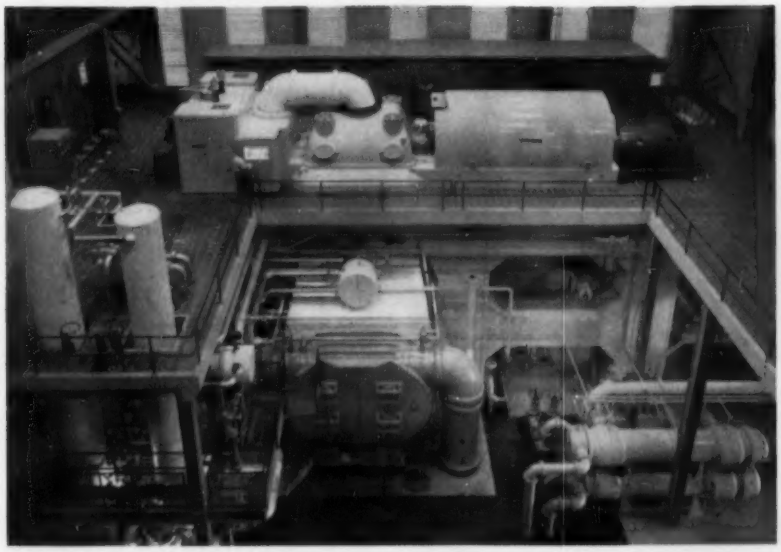
The plant features an air-conditioned central control room with a semicircular bench-type control board using miniature indicating gages, annunciators and control switches. The recording meters and relays are grouped on vertical panels that form the walls of the control room. Television is installed for observation of flame conditions in the furnace and a vision duct with a system of mirrors is used to show the operator the boiler water level.

Boiler Equipment—The boiler supplied by Babcock & Wilcox is rated at 485,000 lb of steam per hour continuous and is designed for 1,500 psi with superheater outlet conditions of 1,315 psi, 950 F. The boiler is fired with fuel oil using Peabody wide-range burners with a 900 psi maximum pressure and a 300 psi constant differential system. Fuel oil is received from tankers and stored at Iwilei, the industrial area adjacent to downtown Honolulu. It is pumped from this point through approximately 6,000 ft of line installed under the city streets to two 15,000-bbl storage tanks adjacent to the plant.

The boiler is of the radiant type with complete water-cooled, tangent tube-type furnace construction and steel-cased setting. The air heater is of the divided two-stage tubular design with vertical upward gas flow through the 38-ft-long tubes in the hot end and vertical downward flow of gas through the

Design Conditions

Steam pressure at throttle	1,250 psi
Steam temperature at throttle	950 F
Net station heat rate	11,200 Btu/kwh at 2-in. Hg
Fuel	Oil — 600 SSF at 122 F



Photos show close-up of feed-water heaters, (right, opposite page) and turbine room above

19-ft-long tubes in the cold end. One half of the heater can be removed from service for water washing with the boiler on the line. The air heater is supplied with Diamond straight line air puff blowers over the gas entrance to the cold end of the unit. Retractable soot blowers using air for blowing are installed in the superheater and economizer sections. Automatic sequential operation of the soot blowers is controlled from a panel located in the central control room.

Two Sturtevant induced-draft fans with constant-speed motor drive and one forced-draft fan with a high- and a low-speed motor drive are installed. The fans are all located at grade level to minimize vibration. The discharge of the two induced-draft fans passes upward through a flue located between the two halves of the air preheater and thence to the stack, which is supported on the roof of the plant.

Turbine-generator Equipment—The turbine-generator equipment supplied by Westinghouse is rated 50,000 kw at 2.0-in. Hg back pressure. The unit is of the tandem-compound, double-flow type with extractions for five stages of feedwater heating. The generator is rated 57,500 kva at 15 psi hydrogen pressure, 0.80 pf, 11,500 v. The unit is furnished with a direct connected exciter and a spare motor driven exciter. Mag-amp-type voltage regulating equipment is installed.

Cooling Water System—Cooling water for the condenser is taken from the Honolulu Harbor through a 6-ft square concrete tunnel to the screen and pump well located in the plant. A duplicate pump well and tunnel was installed for the addition of the future unit.

Two vertical propeller pumps, each rated at 32,000 gpm, 18-ft head, supply the Westinghouse 40,000-sq-ft divided water box, single-pass condenser. The condenser uses 7/8-in. aluminum brass tubes, 28 ft effective length. Water from the condenser is discharged back to the harbor through an existing tunnel of the adjacent Honolulu plant. Service water for the auxiliaries is supplied from a closed system which uses auxiliary salt-water heat exchangers for cooling the distilled water in the closed circuit.

Condensate and Feedwater System—Two full capacity, vertical, multistage pit-type condensate pumps take suction from the condenser hotwell and discharge through the air ejector, the No. 1 low pressure heater, which is installed in the condenser neck, and the No. 2 horizontal low pressure heater to the No. 3 Elliott tray-type deaerating heater. Three half-capacity constant speed Byron Jackson feed pumps, each rated at 670 gpm, 3,830 ft head, take suction at 305 F from the deaerator and discharge through the feedwater regulator, the No. 4 and No. 5 vertical high pressure heaters to the economizer of the boiler.

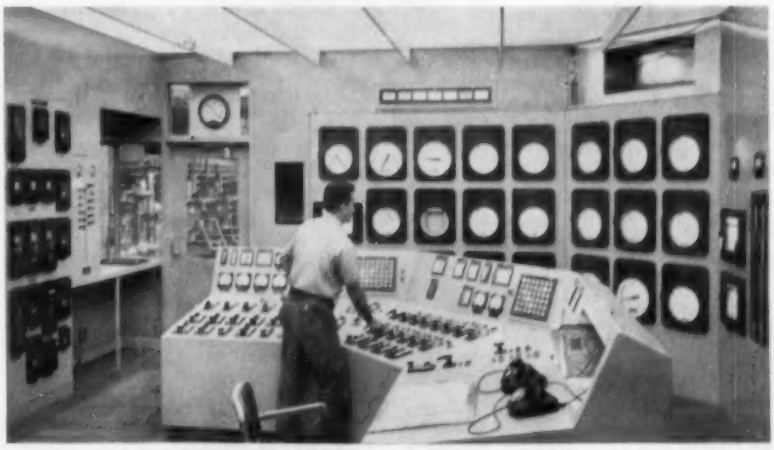
Make-up to the system is supplied by a 90-gpm fully automatic mixed bed demineralizer furnished by the Permutit Co. This unit reduces the 40 ppm of silica in the raw water to 0.1 ppm in the effluent.

Electrical System—The indoor section of the leads from the generator to the main transformers are of the segregated-phase type, 3,000-amp rating, with aluminum enclosure. The outdoor bus consists of three-inch extra heavy copper tubing on 23-kv post-type insulators with polyvinyl chloride tubing over the conductors.

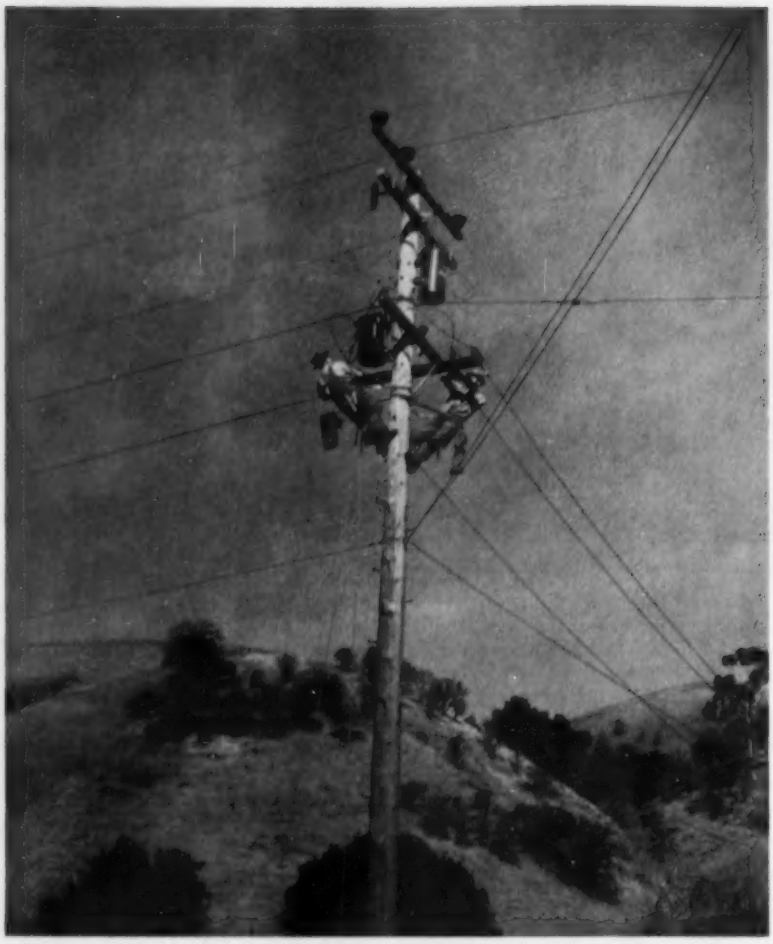
Three operating and one spare single-phase 15,000/20,000 kva, OA/FA, 11/49.5-kv transformers connected delta-wye are installed with a transfer track system. The generator breaker is on the high-voltage side of the transformers. Power is supplied to the system through 46-kv gas-filled cables installed in an underground duct system.

One stand-by and one auxiliary OA transformer, each rated 3,750 kva, 11.5/2.4 kv, supply power to a split bus for station auxiliary use. Relaying for automatic transfer of auxiliaries is provided. Motors 200 hp and larger operate on 2,400 v. All other motors operate on 480 v supplied from a double-ended dry-type power center.

Engineering design was performed by Bechtel Corp. working with the engineering department of the Hawaiian Electric Co. A joint venture of Hawaiian Dredging Co. and Bechtel Corp. was the prime contractor using existing construction forces of numerous island firms.



Luminous ceiling, air-conditioned, centralized control room has closed-circuit television



All work was done on transformer poles that could possibly be done prior to the cutover

How job was organized for

Quick Cutover to 12-kv Primary

C. J. Douglas
Pacific Gas and Electric Co.
Concord, Calif.

Careful advance engineering, thorough organization of the job, briefing of crews, extra transportation, use of 12 mobile two-way radio sets and performing all possible preliminary work —all contributed to the success and speed of a recent 4- to 12-kv primary cutover by Pacific Gas and Electric Co. The job involved cutting over approximately 65,000 ft of line in the Martinez area. Planned cutover and customer outage time was four hours but the job was done in two hours and 43 minutes.

Study had shown that the best way to relieve the 4-kv primary serving a rapidly growing residential area between towns with a definite and well-planned program for the future was to convert the rural area to 12 kv. One 4-kv circuit having its source from a 4-kv, 2,000-kva substation in the town of Martinez, extending 65,000 ft to the most distant customer, was picked for initial conversion. Regulation had been provided approximately two miles from the substation, as shown.

As there was no existing 12-kv source in the area it was decided to install a 22/12-kv, 2,000-kva bank on existing substation property in town, overbuilding the existing 4-kv circuit with 12 kv to a point 4,350 ft from the station, and then cut over the remainder of the circuit to 12 kv. This would relieve the existing 4-kv system of 1,275 kva of demand.

As the existing circuit was radial with no other source to work from, the job was planned to cut over large sections at a time. This would minimize excessive shutdown time to customers, which would be necessary if a series of 12- to 4-kv stepdown banks were used.

The first step was to convert the existing high-voltage, 6.6-amp streetlight circuit, which was carried on the 4-kv arms, to a secondary multiple system. Then by building seevral blocks of temporary 4-kv line as a shoo-fly, it was possible to split the circuit into two separate forks, the apex of which was approximately 1½ miles from the station. The next step was the installation of the 22/12-kv delta-delta, 2,000-kva bank, and the overbuild of the existing 4-kv line to the point where the actual cutover was to start.

Then came the task of replacing insulators, existing wood pins with steel pins, and bonding and replacing deteriorated poles and arms as necessary. There were approximately 550 poles to be reinsulated and 142 transformers to be replaced in the first section to be cut over.

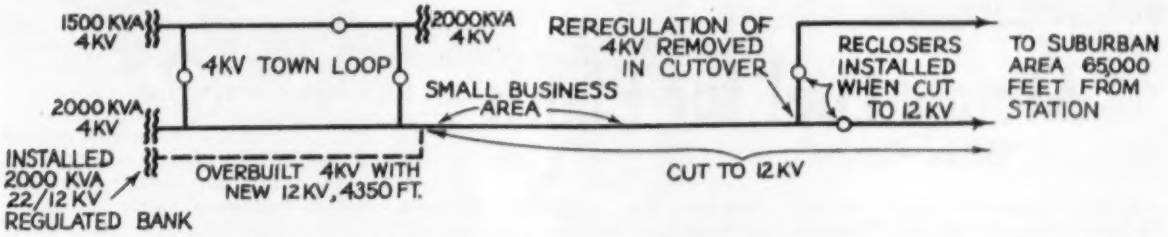
As the reinsulating proceeded, all possible work was done on each pole in order to save future climbs and shutdown time on the actual cutover.

The existing 4-kv neutral was placed on temporary short wing arms or suspended in ¾-in. rope slings two feet below the existing line arm for safe removal later. Where existing secondary did not allow the new 12-kv transformers to be placed on adjacent poles, the existing 4-kv transformers were swung to the back of the pole and the 12-kv transformers permanently installed on the face of the pole. Primary and secondary leads of the proper length were installed on the new transformers, ends skinned and coiled in the clear, with the exception of the secondary neutral lead which was permanently placed on the line. Split-bolt connectors were placed on the secondary line conductors in proper position to receive the secondary hot leg leads later.

Where it was possible to install transformers on adjacent poles the primary connections were permanently made and fuses left open in the cutouts. All transformers and numerous tap line cutouts were replaced but left fused for 4 kv capacity.

To effect circuit balance after the cutover, it was necessary to change taps on all existing tap lines. At these points jumpers were made up on proper phases of the line wires and left coiled in the clear.

At two points where three-phase transformer banks could not be installed on adjacent poles, new poles were placed adjacent to the old poles and the 12-kv banks installed. Services were transferred to these new poles



Work involved in 4- to 12-kv cutover where advance planning and job coordination held the outage time to two hours and 43 minutes

with temporary jumpers tied to the old 4-kv transformers.

Approximately six miles out from the substation the three-phase line terminates and a single-phase line extends six miles beyond. At this point a 100-kva, 12/4-kv transformer was permanently installed and left ready to cut in to continue to serve this long 4-kv tap at 4 kv. Approximately two miles out from the substation, a service restorer with overload and ground protection, set for one test, was installed and cut into the line.

Wtih all possible preliminary work completed, the cutover date was set. All customers in the area affected were notified by letter by the local business office that power would be off for approximately four hours from 9 a.m. to 1 p.m. They were also told the reason why. In one case where there was a sick child and a motor-operated respirator was being used a portable engine-driven a-c generator of the type used by line crews was installed.

It was decided to use eight crews with four linemen or apprentices on each crew for the cutover. Because of the large area covered, it was arranged that each crew would have extra transportation for relaying their men from pole to pole; also each foreman would be supplied with either car or portable shortwave radio for communication.

A large circuit diagram was made of the area and cut into eight approximately equal sections. Each section showed the actual work to be done on each pole and a copy given to the foreman for his particular section.

Prior to the cutover day, each foreman and crew were taken over the section assigned to them to familiarize themselves with the job.

As it was necessary to place protective grounds at various locations for transmission line crossovers, a program was written outlining where each crew would be stationed, who would place grounds, how they would be notified when to proceed with the work, etc.

Promptly at 9 a.m. on the cutover day all crews were assembled at the various areas assigned them and checked by radio. The 4-kv line was de-energized at the cutover point and the crews assigned to place grounds notified by radio. As soon as they reported that grounds were placed, all other crews were notified to proceed with their sections.

There was one small business area, as indicated on the sketch, served by 23 transformers between the cutover point and the service restorer. This was given preferred attention. As soon as all old transformers were cut in the clear on both primary and secondary side, new transformers were cut in, corner taps placed on proper phases and the line energized at 12 kv up to the service restorer. This was completed at 10 a.m., a shutdown time of one hour.

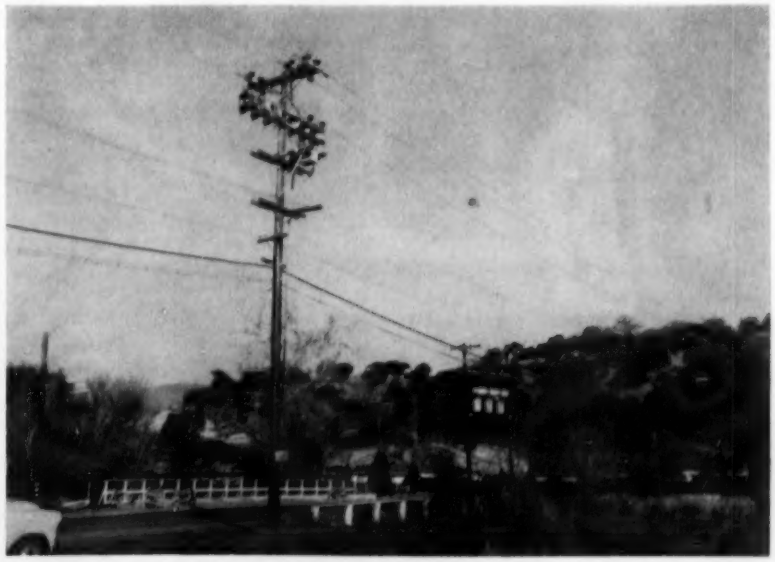
In the meantime close contact was kept with other crews by radio as to their progress. Men were shifted from area to area as they completed their respective sections. When all crews reported clear of their sections, all grounds were removed and the balance of the line energized at the service restorer at 11:43 a.m. This was a total shutdown time of two hours and 43 minutes for cutting over 142 transformers and changing many corner taps and line fuses. In all, 227 poles were climbed during the cutover.

A phase rotation check was made and marked on all three-phase customers' service switches prior to the cutover. Before energizing at 12 kv these switches were opened and rotation and voltage checked before closing, after the cutover. Voltage checks were made at various other locations after the cutover. Current readings at the substation showed circuit balance satisfactory.

Not a single complaint was received by the local business office during or after the cutover. After the cutover, the 4-kv neutral and all 4-kv transformers were removed without further interruption to service.

It was gratifying to see the interest shown by every member of the crews involved. For many of them it was the first cutover in which they were involved and they all derived a great deal of personal satisfaction in the job.

The remainder of the circuit cutover can now be done in short sections with brief shutdowns. This work is now in progress.



Reclosers were installed (foreground) and 4-kv regulators (background) were cut out

Western Utilities Consider

Atomic Fuel for Plants

Eager response at a two-day Atomic Energy Conference in San Francisco sounded the depth of the electric industry's interest in using nuclear energy for electric power generation.

Stanford Research Institute and Atomic Industrial Forum Inc. joined forces to present Atomic Energy—The New Industrial Frontier, April 4-5, and attracted 581 people from a large part of the U. S., particularly the West.

With a roster of 34 authorities representing as many different phases of nuclear energy research, the conference served to inform the group of the current progress in development and the problems yet to be solved.

Encouraging Progress

Encouraging evidence of the progress toward use of atomic energy for power generation was contained in a graphic description of the dual-cycle boiling-water reactor developed by General Electric Co. reportedly for use in the 180,000-kw generating station proposed by Commonwealth Edison Co., Chicago, a member of the Nuclear Power Study Group. Samuel Untermyer II of G-E said that the reactor can equal operating costs of conventional steam plants at high load factors.

Untermyer said dual-cycle design offers increased efficiency as compared with reactors using heat exchangers. The reactor will develop 600-psi steam directly to the turbine, and the steam is then converted to 350-psi subcooled water by a by-pass system and flash tank. The water returns to the feedwater system. Merits of the design emphasized by Untermyer are: low reactor pressure, greater operating safety, load range flexibility and self-stabilization to allow instant load changes.

Developing his information on operation economy, Untermyer assumed fixed charges of 14%; operating and maintenance expense of $5.60 a kw-yr; a 9,000-Btu heat rate, and a 1.5-2 mill per kwh charge for fuel. He said the unit shows promise even with a 40-50% load factor average over a 30-year life. Estimated cost of the plant would be $200 to $270 per kw plus the cost of land. He said safety factors of the reactor would eliminate the need for an exceptionally large site.

Building sites of atomic-fired generating plants were mentioned several times in the course of the conference, because it is generally believed that a safety precaution necessary is to build the plant away from industrial areas where it would normally be. If this proves to be true, then land costs become a major expense item in construction.

In contrast to Untermyer's de-emphasis of the importance of a large site, Dr. Edward Teller, professor of physics, University of California, said that a plant should be constructed to have adequate control of the worst possible accident that could occur, including a margin of space around the installation.

Ray L. Stoker, manager of the Rocky Mountain Nuclear Power Study Group, reported that the heterogeneous reactor his group is working on would not cost more to construct than conventional steam plants, except for the site preparations. He referred to safety and security. Speaking about the reactor itself, Stoker reported that results of preliminary studies by his group, organized in November 1954, show that reactors operated without an accompanying conversion of fertile material are not economically satisfactory. The group's studies are now along the line of recovering usable fissionable material from the original reactor charge for re-utilization in the reactor.

Charles G. Manly, acting chief of the industrial liaison branch of AEC, also mentioned that two long-range projects of the AEC's five-year program are devoted to breeder reactors. Object is to recover a usable material which would help reduce fuel expense of power generation. Manly said, "The cost per kilowatt of installed capacity must come down, and we must get more heat out of a pound of fuel before having to take it out of the reactor for chemical processing." He reported that reactor scientists and engineers are also banking on lowering the costs of chemical processing, fuel fabrication and waste storage.

Manly reported that the AEC has set the long-term prices it will pay industry for the plutonium it produces and also for uranium 233, on the basis of the value of these materials as substitutes for uranium 235 fuel in power reactors. Some of the economies of operating nuclear powered generating stations lie in the success achieved in recovering these materials from original fuel charges.

Conservation of the world supply of uranium is already a consideration and Dr. W. C. Rueckel, vice-president, Kaiser Engineers, said heavy water as a neutron moderator gives a comparably higher conversion ratio and therefore a saving in fuel. Rueckel pointed to the problem of disposal of nuclear waste, saying that present methods are merely temporary expedients and that there is a need for practical and economical methods.

The same thought was amplified by Dr. Glenn T. Seaborg, professor of chemistry, University of California, who said the waste disposal is the limiting factor of future use of nuclear-powered plants. He asked for more research and expenditure by industry to solve the problem.

Confident of Achievement

A joint presentation by J. N. Landis, vice-president, Bechtel Corp., and C. C. Whelchel, chief mechanical engineer, Pacific Gas and Electric Co., voiced most of the attitude of the electrical industry to atomic power in the industry. A firm belief that nuclear energy for power generation is coming and enthusiasm for that new development are tempered by full awareness of many problems not yet solved.

Whelchel introduced his remarks by saying "we believe nuclear power is going to supplement but not supplant conventional methods of generating power when it becomes economically competitive."

Landis described the role of the engineer-constructor in the pioneering stages of development. Remote location, transmission line losses as a result and the high cost of much larger sites were mentioned as possible costly details affecting economy. He said that most of the problems in laying out nuclear powered stations arise from the fact that a reactor is an intense source of radioactivity that is extremely dangerous if not properly confined. With confinement come control problems that are new to the industry.

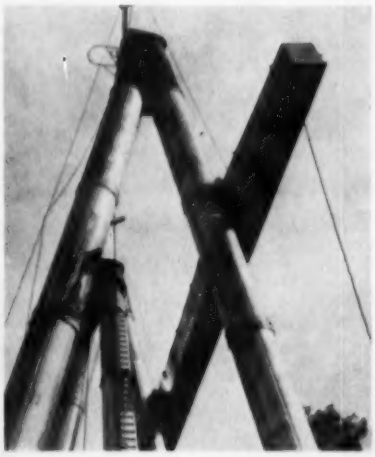
After pointing to these and many other challenging problems, Landis expressed confidence that they will all be solved.

Both PG and E and Bechtel Corp. are members of the Nuclear Power Study Group that is behind the 18,000-kw station proposed by Commonwealth Edison.

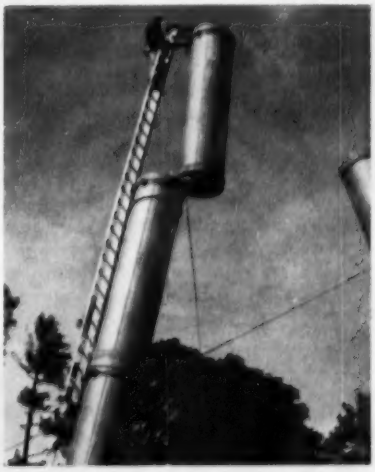
General conclusions derived from the wealth of technical, semitechnical and more or less philosophical information presented at the conference were that the evolution to nuclear fuel use is just beginning, that its progress is sound and assured, and that it marks the beginning of a new era in the electrical industry.

Aluminum Towers for Alcan Line

Great engineering interest has been shown in the aluminum towers used in the Kildala Pass section on one of the two 51-mile, 300-kv lines transmitting power from the Kemano hydro plant of the Aluminum Co. of Canada to its reduction works at Kitimat, 500 miles north of Vancouver, B. C. Difficulty of obtaining steel during the Korean war led to a decision to use aluminum for the towers. H-frame structures utilize thin-wall tubular legs with 38 in. over-all diameter. On these legs is mounted a box girder aluminum arm



Aluminum towers showed substantial savings over steel because of less components, easier fabrication, easier transportation and distribution and lower erection costs. Light weight and freedom from corrosion were important considerations influencing choice



Tubular legs of aluminum tower with permanently installed ladders inside permit safe, sheltered access to its top and through crossarm to conductors. This was an advantage during construction and is particularly important from the maintenance standpoint

Tower legs are arranged as an A-frame and a tripod. Crossarm rests freely on caps, guided by pins. Tubular legs are composed of sections bolted together inside, provide excellent strength and stability under unusually heavy axial loads and stress moments

Something added: Each classroom has two evaporative coolers to temper the desert heat, as well as heating for winter temperatures

Even the Schools Are Big in Las Vegas

Everything gets big in Las Vegas, Nevada — resorts, casinos, hotels, and population. The latter have made bigger schools necessary and like the power facilities, steps are being taken to increase them.

Recently completed on the north end of the city at Owens and Bruce St. in a growing tract development area, is Rancho High School No. 2, designed by Claude Beelman & Associates, architects, engineered by Floyd A. Peterson and whose electrical work was installed by Acme-Collins Electric Co. of Las Vegas, affiliated with Collins Electric of Stockton, Calif. Of interest especially is the electrical distribution system needed because of the wide area covered by the school.

Like most modern schools in the southwest the single story buildings, 17 of them in this case, are spread over considerable acreage. Of the 17 there are 14 classroom buildings with five classrooms in each. To these are added a large auditorium and a gymnasium and a multipurpose building with cafeteria and shop facilities.

Service is brought in from a Southern Nevada Power Co. line along the street at 12,470-v to an outdoor substation reducing it to 4,160-v, thence underground to two substations, one in a special room at one end of one of the administrative group of buildings, the other some distance away in one of the series of parallel classroom buildings. All meters are located on the outside, a rule peculiar to this area for this size of load.

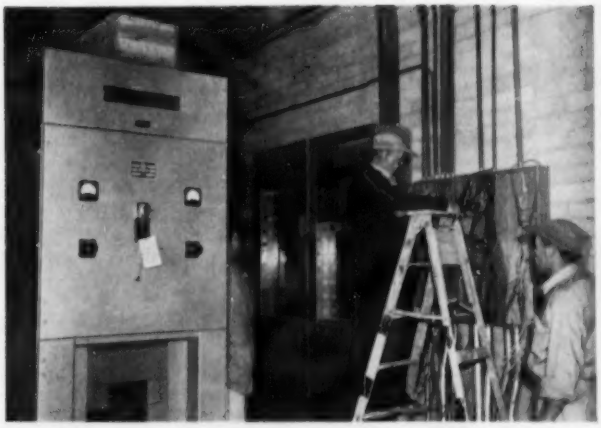
In the No. 1 substation of 300 kva the primary 4,160-v is transferred to 120/208-v 3-phase for lighting and 100 kva to 240-v 3-phase for power. Two separate unit substations are thus supplied as well as one transformer for the cooking load. The lighting substation supplies 15 lighting panels. The power substation supplies 14 power panels. There are three panels supplied by the cooking load transformer, which is a 75-kva, 12,470/120/240, single-phase unit.

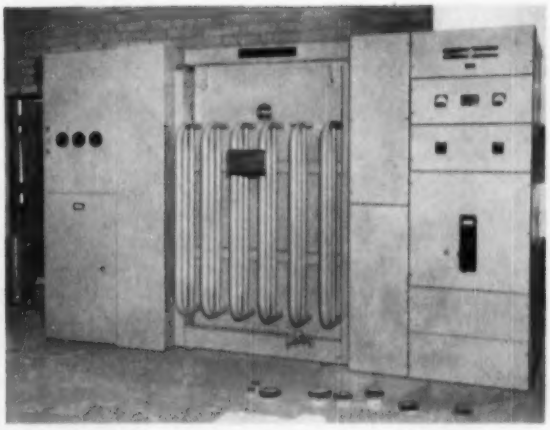
In the second substation, of 167 kva, seven lighting panels are fed.

Distribution from these substations to each of the buildings is taken underground in fiber conduit encased in concrete to panels in each building. All wire used was Type RRD. Where runs

Fiber conduit runs underground from the unit sub to each unit

Stubs to the unit sub and panel locations before slab was set





Two unit substations, 4,160/120/208-v, 3-phase, supply lighting. In one, an additional 4,160/240-v, 3-phase supplies power panels

were taken in the slab they were in conduit—in fact the entire job was in conduit. Manholes were located at convenient places for access to the long underground runs.

Equipment Installed

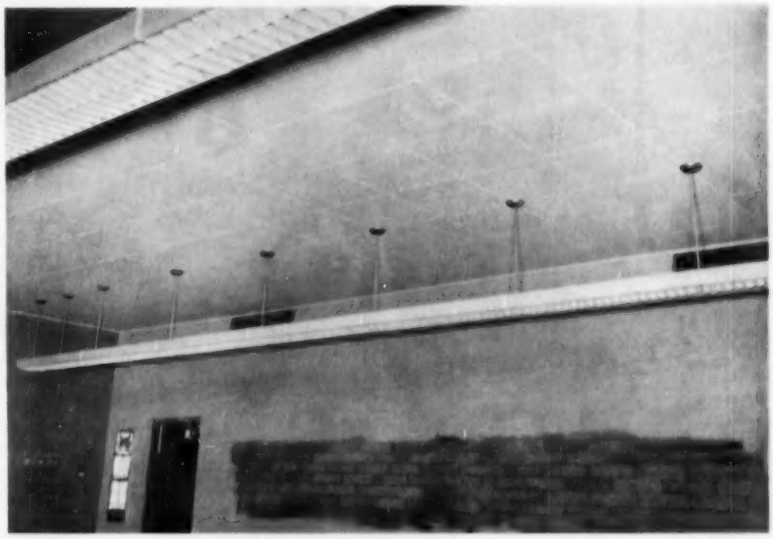
In each classroom, in the corner near the door to the outside covered walkway, is an especially designed cabinet which mounts the clock, the speaker for the intercom system and the control switches for the fluorescent lighting and the evaporative coolers. These cabinets are made of galvanized steel with a hinged aluminum front panel of velvet finish.

Each room has two evaporative coolers, individually switched. Lighting is from two continuous rows of louvered Supreme fixtures lamped with 4-ft slimlines, switched so that four combinations may be lighted. The fixtures are suspended on stems of proper length beneath acoustical and heat-insulated ceilings.

In addition to the lighting other systems installed include a Hannon Engineering Co. sound system for use either as public address supplement locally or as a general sound system to receive from the office. A fire alarm system, and IBM clock system are also provided. The auditorium is equipped with stage lighting equipment and dimmer control board. The cooking load consists of cafeteria equipment and ranges used in the home economics classrooms.

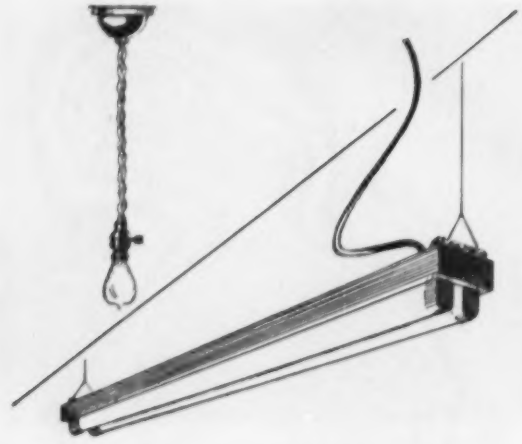
Construction of the building was of concrete block with steel truss for the roof and steel decking over the walks. Lighting units to flood the exterior at night were set into concrete blocks in baffle walls at the end of each building.

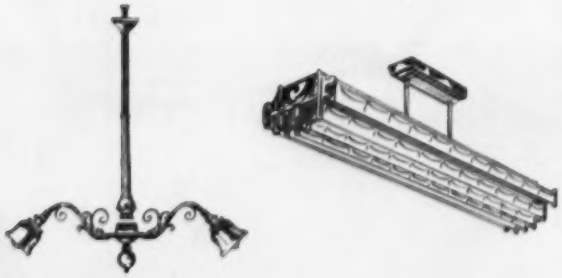
Andy Shepard was superintendent of this job for Acme-Collins Electric Co.

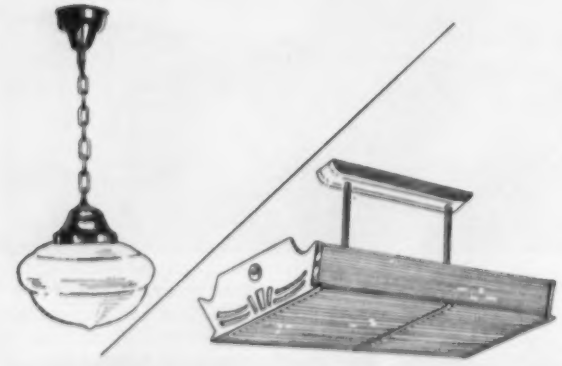


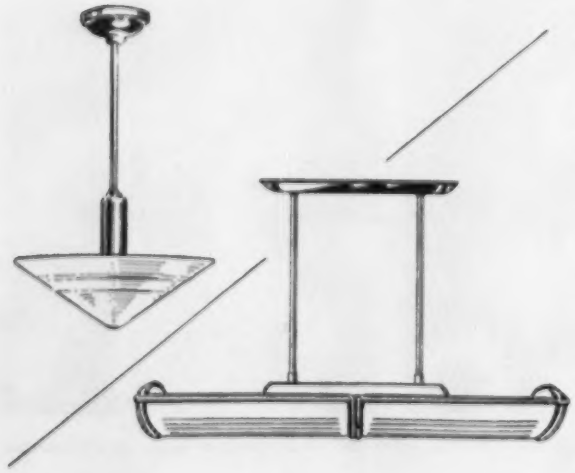
Each classroom has two continuous rows of two-lamp louvered fluorescent slimlines

Especially designed enclosure in each room for clock, speaker; light, cooler switches









Luminous Evolution

Briefed from an illustrated talk by
John S. Walsh, PG and E

In the past 75 years our lighting practice has gone through a logical development, not once, but twice—from bare lamps to shielding to diffusion to luminous indirect fixtures. Now we are striking off in a new direction toward luminous diffusing systems.

In 1939 the lamp companies brought out a new light source. Wait a minute. This is where we came in—1879. A bare lamp on a drop cord. Just two fluorescent tubes on a channel suspended from the ceiling. Well, obviously we cannot look at the glare of a bare lamp and some of the light ought to be directed on the working plane.

This a somewhat typical lighting fixture of 50 years ago. The glare from the tantalum lamp was reduced and the light carefully directed below. The lighting fixture business was born with such units patterned after their predecessors for gas or candles.

One of the first fluorescent fixtures, shielding with etched glass panels and light control of a sort. Doesn't it remind you of early incandescent lighting? The first fluorescent fixtures seem to have to go through the same cycle. Let's see, what was the next step?

With the tungsten lamp, higher light output and a concentrated filament, glare became really acute. The glass blowers solved it by gathering a bit of white glass on a blowpipe, taking a dep breath and spreading the light all over an enclosing globe. So, because customers wanted more light, lamp companies made bigger lamps and glass blowers blew bigger globes but it was a losing battle.

This time we have a linear source instead of a point source, so of course we use sheets of glass instead of globes. Only now we have 30-lb ballasts and 20 lb of glass hanging on two aluminum stems overhead. Let's hope the electrician fastened them tight.

Back in 1906 Augustus Curtis had an idea. Why not throw all the light to the ceiling and let it come down as the gentle rain from heaven. The light would be soft—no glare—and the entire ceiling was the apparent light source. Energy and lamps cost more than today so indirect lighting was a luxury at first. Manufacturers improved the early units, made them luminous to blend with the ceiling brightness. But soon heat became a problem as people wanted more light.

At long last fluorescent practice caught up with 1939 with the luminous indirect fluorescent fixtures. It took almost 10 years. We gained in foot-candles for the same wattage and no longer had the heat problem. But people still demanded more light. To produce it required a fixture display room full of fixtures on close spacing. Once again we came to a dead end. What do we do next?

About 10 years ago someone had a solution—why not make the ceiling itself a light source? And so tubes were run across the ceiling in continuous parallel rows and the glare shielded by eggcrate louvers. Then came glass diffusing panels and now lightweight plastics to bring the sky indoors . . . At the present stage in the constant evolution of light, luminous systems offer the best and most economical way of providing really comfortable lighting in the 75 to 125 f-c range.

This complete luminous ceiling at McGraw-Hill reception room was installed by Mayer Electrical Contractors, but in many cases there's a question who's to do it . . .

Will It Be "Ceiling Zero"

for the electrical contractor, asks . . .

Robert A. D. Schwartz
Schwartz & Lindheim, Oakland

What is the place of the electrical contractor in the new field of area illumination? How can he prepare himself to take a part? What does he expect from the other branches of the industry—the manufacturer, the utilities, electrical wholesaler, electrical engineer?

The electrical contractor must find the answers to these questions or face the prospect that for him this new form of installation may become ceilings zero.

First of all, let us look at the first question — What is the place of the electrical contractor in the field of area illumination?

The most direct answer that I have found is in the answer driven home by most sales managers, "Get the Order!" This however is not an adequate answer to those outside of our industry. Hence, a brief look into the development of area illumination might give us an insight into this question.

In years gone by the electrical contractor traditionally has been engaged in specification installations. What is in the electrical specs goes in the job and any work called for in any other section of the project is "not his work."

In most cases, lighting fixtures have been part of the electrical specifications. Except for certain commercial jobs this is true, jobs where the architect wishes to select special fixtures. There is a wide selection among manufacturers for the specified fixtures, as a rule.

As many manufacturers have found out, the electrical contractor is the buyer and the wholesaler is the merchandiser to the buyer. The specifications merely establish the general rules for the performance of equipment and therefore define the rules for selection by the contractor of one of several makes, which can perform according to the specifications.

The industry has seen lighting fixtures grow from an occasional bright spot on the ceiling to ever-expanding long lines of illumination. Now they have reached the place where they have engulfed the entire ceiling area of a building.

This has created many problems for the industry. Traditionally the ceiling has been the place where most sound-absorbing materials have been applied. Provisions have to be made for the acoustical correction. Most of the area lighting systems involve a suspended diffuser in connection with the lamps themselves. Therefore acoustical problems and suspension problems have created a fear in the minds of some electrical contractors even though these be men who have mastered complexities of the most complicated of all trades. I have seen contractors who wouldn't blink an eye at a job with 1,000 different items required to be selected from an industry that has 10,000 parts to offer. Yet they shiver in horror and turn down installation of diffusing systems containing no more than 15 different parts.

As a result, other trades familiar with suspension systems and acoustics have entered this field.

The second problem created by this new area approach to lighting is that the architects and owners have become aware of lighting. Previously the architect had regarded lighting fixtures as a sort of necessary evil. Occasionally they would turn their hand at designing their own fixtures or at selecting a particular design or at hiding the light. But in the main they have stayed out of this field because of the problem of placement of lights and the attendant circuiting and wiring problems.

Now with the advent of modular construction, where the lighting fixtures are either hidden or placed in a constant modular position, they are coming into the act, so to speak. And with good reason, too. For the architect is responsible to the owner or occupant for the over-all appearance of his interiors. We must be prepared to offer him a selection of modules and shapes to fit in with his concepts of interior appearance.

We might be able to argue with this or that lens on a fixture but we have to admit that a lighted corrugated plastic covering an entire ceiling does involve considerations other than lighting alone. So the architect does want a part in the specifications of our area lighting systems.

To answer the first question then, the electrical contractor's place in area illumination will be predicated on his ability (1) to educate himself in the new methods and techniques of suspension, as well as developing a skill in acoustical engineering, and (2) to deal with the architect in the aesthetics of lighting and design.

This then leads us to our second question of how the electrical contractor can prepare himself to take a place in this field.

The answer here is really a very

simple one—education and experience.

Most of the contractors' associations have introduced their members to the various methods that are commercially available. This has, as usual, excited the interest of some and been passed by by others. But we can reliably report now that there are at least some electrical contractors operating in each area that are familiar and have experience in installing area lighting systems of all types. As time goes on this number will increase so that a few years from now installation of area lighting should be fairly standard practice.

Limited Variety

Unfortunately the varieties of materials available have not kept pace with the desire of the architects. There have been a fairly limited number of systems and shapes offered to the architect. This will in time be corrected also but in the meanwhile those of us actively in the field have been forced to develop our own sources of supply while we have waited for the large manufacturers to catch up with the needs of the industry.

Here we might point out that many manufacturers have limited their output to one very limited method of producing plastic diffusers. It seems that long corrugated pieces are cheap to produce and therefore are the vogue. But as one architect put it, "if I wanted a ceiling to look like white corrugated iron it would be splendid."

Acoustics, on the other hand, is a field that has escaped us. Sound engineering and acoustical control is a field that quite properly might be included in electrical engineering, especially since a great deal of sound equipment today is being installed in offices, stores and places of public assembly.

Most of the work in acoustics, however, has developed from the aspect of sound absorption, not sound introduction. Therefore the manufacturers of sound absorbing materials have set up their own distributing and contracting industry.

The electrical contractor must learn about these methods and how properly to combine acoustical absorption with the area lighting systems. That is if we are to perform our proper service in this field.

One more area of necessary education is in the field of building codes. The electrical sections of the codes do not regulate ceilings. While we choose to call these methods by the term "area illumination," most all of the codes do contain requirements for ceilings, "the upper interior area of a room," into which definition area illumination most often fits.

So we must become familiar with code requirements and the state fire marshal's regulations governing this new field.

In answer to our second question then, the electrical contractor must educate himself, get the experience of installing these area illuminating systems and develop his sources of supply and lighting engineering background.

We cannot do this job alone and we need support from the rest of the industry. They are our friends and really are the other members on our team.

How Industry Can Help

Our third question as to how the industry can help — the manufacturers, utilities, engineers, wholesalers and electrical associations — naturally follows. It is here that we can unite for strength.

For simplicity, let me outline a few thoughts in each category to start our thinking in the direction of cooperation.

The manufacturer of lighting equipment must produce for the architect as well as the lighting industry. (1) He needs to do research into the types of patterns, modules and designs that will be desirable. (2) He must organize to sell and service architects at the specification level for the AIA has adopted a policy that the architects should specify the diffusing systems in a separate section of the specifications. (3) He must manufacture systems to meet the codes and ordinances and supply technical data for revision of codes where possible. (4) He should supply help to the contractor in bidding these installations, both from a technical standpoint and as to cost comparisons.

The wholesaler can help too. (1) There is a need for stocks to be maintained to fill in the service to contractors. These jobs go in fast and there is no time to wait for small missing or misplaced parts that must come from a distant plant. (2) The wholesaler can help the contractors too in locating jobs to bid on and in selling installations to their contacts. (3) The wholesaler can help to educate his contractor customers in the various methods available. (4) He should attempt to represent at least one manufacturer for each basic type of suspension ceiling. This will eliminate a great deal of difficulty that contractors presently have in finding sources of supply.

The electrical engineer has a real job on his hands. He is faced with selling the architects on putting these area systems back in the electrical section of the specifications. This is not going to be as hard as it sounds.

First of all, as more manufacturers get into this business, the architect is going to need help to evaluate the various systems.

Second, the architects are already having trouble in specifying and obtaining lighting performance. Many are losing vast quantities of light through the use of multilayered plastics and by the lack of modern thicknesses and quality of plastic. Installations have been specified where acres of brightness have caused discomfort and eye strain that could have been avoided with proper design and shielding.

Third, systems are coming on the market that will not permit the separation of the diffuser and the light source. This will mean an economic penalty to the job unless the area lighting system is placed in the electrical section.

Fourth, as more and more electrical contractors secure these jobs, there will be a question raised as to the necessity of having two electrical contractors on a job with the double overhead and profit necessitated. Contractors will begin to bid the combined jobs for less than the sum of the bids on the separate sections of the specifications.

So the engineer has a selling job to do to the architects on behalf of all of us.

The electrical utilities can do a great deal in their own areas through (1) leading the way by installing these systems in their own properties, (2) creating public acceptance through good publicity and sales and (3) supporting the electrical contractor as the best installer for diffusing systems because he can guarantee the entire installation and can offer a variety of products to choose from.

Research Needed

Our electrical associations can be a real source of strength. It is here that we gather to compare ideas on sales, on installation, on how we can work together. More important, our associations must initiate and continue research in this field. The large building materials manufacturers spend thousands of dollars to do basic research on all kinds of lighting—sky lights, glass blocks, transparent plastics and the like. We must get the facts for our industry. Research such as is being conducted by PCEA's school lighting research committee is vitally important to our industry.

In summary, we can honestly say that the electrical contractor has a real part in the area lighting field as part of our team. We are lining up our sights on the lumious ceiling business and as we go forward we can effectively work with the industry to zero in on this target.

If we work together as the zero hour approaches and the contractor is let in on these jobs, we can call out to you "Ceilings zeroed—we have the order!"

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Low bids, thin margins

Lots of bidding by lots of bidders marked the beginning of spring as plans emerged from architects' and engineers' offices. Bidders, however, swarmed over them in numbers. This brought the bids to some remarkable lows. Differences of as much as one-third of the entire cost of a job were seen in some tabulations. Ironically, the unions have used this in negotiations for more pay, saying to contractors, "If you can afford to give so much away, we want some of it."

California cases

Council on Industrial Relations, meeting the week of May 16 in Chicago, will have three cases from the Northern California Chapter, NECA, among the number to decide. They involve traveling regulations and wage rates in the Alameda County and Vallejo areas.

Asking price reduced

A seven-hour day at the take-home pay of an eight-hour day led off in the asking price of both the San Francisco and Oakland side of the Bay in recent negotiations. This has been dropped and the wage demand is reduced now to 15c per hour increase. San Francisco is waiting to see what the council gives Oakland, not being committed to take its case to council. Unions first asked for seven-hour day, three-week vacation, eight paid holidays, health and welfare for the whole family, and more tool insurance. Couldn't think of anything more to ask for.

New manager

Laurence C. Rodgers has been appointed on the Council of Industrial Relations for the electical contracting industry under the recent new ruling providing for an association manager on the council representing employers. Another change is a disposition on the part of the council to hear cases near the center of the greatest number of cases submitted. Rodgers is manager of the Northwest Line Constructors and Oregon-Columbia Chapters of NECA in Portland and was once a member of the National War Labor Board.

Spring cleaning

International Brotherhood of Electrical Workers in British Columbia announced expulsion of George Gee, business agent for Vancouver's local 213, after conviction on 13 charges of leftist activities, according to John Raymond, Toronto, international vice-president. Also suspended were 21 rank-and-file members found guilty of leftist activities inside IBEW.

New orders

Electrical Safety Orders of the Division of Industrial Safety, State of California, became effective April 11 but printing delays held up distribution of the new books. They were expected momentarily. Orders for them may be placed with the Printing Division, Documents Section, N. Seventh St. and Richards Blvd., Sacramento. Price is $1.03 including tax.

Open shops

Utah's "right-to-work" law becomes effective May 10. It was passed at the recent session of that state's legislature. Construction contractors are expected to find it troublesome for it outlaws closed shops.

Process of law

California's Legislature has not yet passed any of the many bills affecting the construction industry before it. AB 2074-5-6, for subbidders' listing law improvements, passed through committees and the assembly by a good majority. AGC opposed it bitterly all through. It has yet to be passed by the senate. SB 1670 designed to limit home owners work to strictly their own premises, has been heard in committee. A counter bill, AB 2519, prohibiting segregation of bids on public works, has been postponed. AB 2079 making amendments to the contractors' license law, affecting classification, has been put in the inactive file.

Getting lit up

Home lighting as in life itself, was the weakest part of the IES programs both at Phoenix and Los Angeles. Architect F. Guirey spoke briefly at Phoenix on possibilities and limitations of fixtures, pinhole spots and coves. W. A. Cyr, Electrical West, kidded the whole subject with a talk, "A Home Is Not A House," comparing home lighting to that in bars.

Garden lights

F. B. Nightingale, designer of artistic and inconspicuous garden lighting equipment, emerged from wartime metals restrictions to show a number of new items in garden lighting equipment, made by Kim Mfg. Co., which he founded. It is now run by his son and son-in-law. He gave a demonstration of the equipment at the Los Angeles IES meeting.

Home lighting workshop

Someone is doing something about home lighting. Byron G. Payne of Arizona Public Service tells that Arizona State College and Arizona PS will co-sponsor a college-accredited home lighting workshop May 31 through June 4, the first of what is to become an annual affair at the Tempe college. For more details, see story next month.

Price support

"Now You Can Be Certain." Central Electric Supply Co. of Denver tells its contractor customers and backs it up with a $500 performance bond. Sam and Ira Beck, president and vice-president, use this assurance that their company will sell only at wholesale. Story next month.

NECA meeting

National Electrical Contractors Assn., Districts 6 and 8, meet together at San Francisco's Sir Francis Drake Hotel May 26-28. President Don Clayton, Executive Vice-president Paul Geary, E. R. Cornish, director of research and education, Howard Farley, sales promotion manager, will represent headquarters. Delegates from all the Western chapters are expected to attend. Extra time has been given to the labor workshop on Thursday and Saturday. IBEW Vice-presidents Oscar Harbak and Lee Anderson will be guests for this session. The program covers the scope of NECA activities in line construction, codes and standards, apprenticeship and journeyman training, business development, research and education, and cooperation with the National Lighting Bureau.

Distributors meet

Area meetings of National Association of Electrical Distributors for the West were held, first at Long Beach April 27, San Francisco May 11 and another is to be held later at Spokane, according to William Jewell, managing director, Pacific Zone.

Tribute

A bronze plaque, bearing an inscription to the memory of Howard Grindal Dodge has been mounted in the lobby of the Santa Clara testing station of Underwriters' Labortories Inc. J. A. MacNabb has been appointed electrical engineer for that laboratory. He had been associate electrical engineer under the late Mr. Dodge.

Inherit chief

Head man of the National Adequate Wiring Bureau, its chairman, Larry Walker, is now a Westerner. He succeeded Ray Turnbull as G-E commercial vice-president for the Western states in San Francisco last month. Walker was G-E's vice-president in charge of the wiring materials division at Bridgeport.

Expanding

Graybar Electric has opened a branch out of its Phoenix office at 212 S. Park St., Tucson, with S. S. Swartz from the Phoenix branch as supervisor. Six thousand square feet of space is provided for local service.

New plant

Steber Mfg. Co. of California has set up a plant at 242 S. Anderson St., Los Angeles, where John Kresich is sales manager and Paul Waterbury is lighting specialist. It is a warehouse and assembly plant for the West.

Moving

Nevada Chapter, NECA, appointed H. E. DeVilliers as its manager. He formerly was business manager of the painters and decorators joint committee in Las Vegas and succeeds Jim Jeffers Sr. The chapter will move its offices to Las Vegas, A. G. Mainland, chapter president, announced. A recent meeting at Tonopah discussed the business development program and job management course.

Light education

The certified lighting program is underway in the Bay area. In San Francisco eight-session course began in early May. Same courses are given in Oakland. Registration at the latter was 44. A charge of $20 covers cost of manual and text materials. Sessions are 2½ hours long, the first half devoted to lighting design and the second half to lighting sales. The course was sponsored by the National Lighting Bureau, Northern California Electrical Bureau, NECA and PG and E. The steering committee is headed by Frank Falge and represents various branches of the business. Other courses are run in San Mateo and San Jose.

Pioneer

Spokane has become the first city in the U. S. to require a 200-amp service entrance on all homes of more than 500 sq ft. It applies to all new starts on home construction. The initial installation need not be for 200 amp but service conduit and cabinet space for it must be provided.

Prohibition

Grounding of dryers, ranges and similar equipment to the neutral circuit conductor is prohibited in San Francisco by an order issued by James A. Graham, chief inspector.

Safety helmets extra

Fire hazard in luminous ceilings has been a bone of contention. However, after witnessing some tests himself, Joe R. Yockers, state fire marshal, California, issued a letter saying that his department was satisfied if plastic luminous ceiling materials do not readily become detached and fall from their mountings when subjected to an ambient temperature of 350 F for a period of 25 minutes. His tests indicated that most of the commercial types would resist that temperature, although at higher temperatures they would fall out.

Hot and cold elections

Alaska Chapter, NECA, announces election of C. R. Siegel, Hall Electric Co. Inc. of Fairbanks as its new president, F. L. Banks, Pioneer Electric Co. Inc. of Anchorage, vice-president, D. D. DeMers, Modern Electric Co., Anchorage, treasurer, R. B. Grosclose, City Electric Service, Fairbanks, governor, and Joe Marshall, manager . . . At the other end of the West, in San Diego, the chapter elected H. L. Faucher president, succeeding Al Myers, A. C. Eddy vice-president, Gene Bolinger treasurer and Oscar Lundberg governor. Shelby Wiggins is manager. Matt Sherwood, field director, inaugurated the new officers.

New process

Fluorescent Fixtures of California moved into its new plant for the production of All-Brite lighting fixtures, South San Francisco, just off the freeway. One of the major items in the new plant is a new electrostatic spray finishing operation for the painting of parts. This is known as the Ransburg No. 2 process, which has reduced labor costs and paint costs and increased production. This will be described in a later article.

Old bill new number

Federal Construction Contract Act with a new number, S1644, was to be up for hearings in May before the Senate judiciary committee. This was the bill NECA endeavored to have passed last year and which met the opposition of AGC. It would call for listing of subbidders on federal works and is designed to prevent bid shopping and bid peddling. Members were alerted to contact their senators, urging its adoption.

Hayward branch

Standard Electric Supply Co. has opened a Hayward branch at 1881 Jackson St., according to Bud Edwards, proprietor. Jim Scannell, who has been in the Oakland headquarters, is in charge. The place has 3,100 sq ft of area, parking space. Main Standard supply house is at 1101 W. Grant Ave., Oakland. Specializes in electrical supplies for contractors and maintenance men.

Visits, moves, honors

News of People: Norman Wicks, manager, National Adequate Wiring Bureau, visited San Diego and spoke at San Diego Electric Club May 2. He is also IAEL secretary and worked with J. Clark Chamberlain on the fall convention . . . **James H. Brundage,** Day-Brite representative in San Francisco, now also represents the Rambusch Decorating Co. of New York, maker of church and special lighting equipment. **Ed Rambusch** and **R. W. Barnes,** engineer of the firm, were in San Francisco April 28 and 29. Brundage is at 288 Seventh St., San Francisco . . . **Robert Ford,** formerly with Smoot-Holman Co. and recently with Westinghouse Electronics, is now with Sunbeam Lighting Co., Los Angeles . . . **T. O. Gerlische,** consulting electrical engineer, Oakland, announces moving to more spacious quarters at 132 Ninth St., Oakland . . . **Walter J. Walsh,** attorney with a long electrical background, moved from the Sharon Building to 68 Post St., Suite 711, San Francisco . . . **Romaine W. Myers,** consulting electrical engineer, was honored at a special meeting of the East Bay Electrical Club, at which Scott Beamer was master of ceremonies. He was honored for his more than half century in the industry.

Shows wares

Corning Glass Works presented an exhibit of its engineered lighting glassware Los Angeles April 13, in Hotel Statler and at the Sheraton-Palace Hotel, San Francisco, April 20. New developments in controlling light by means of glassware were exhibited to architects, engineers, contractors.

Happy coincidence

A week-long exhibit of lighting equipment was staged in the Arizona Public Service Co.'s auditorium in Phoenix by some 20 manufacturers and distributors. It was coincident with but not connected to the IES Conference but gave an opportunity to lighting men to see representative samples of a great number of lines. Makes represented included Smoot-Holman, Guth, Earl, Sylvania, All-Bright, Prescolite, Lightolier, Progress, Globe, Sunbeam, Kirlin, House of Lighting & Lamps, Art Metal, Miller, Grayco, Ruby, Smithcraft and Day-Brite.

Help

Newest helper on the adequate wiring program is Allis-Chalmers. Although making little equipment used in the home itself, Allis-Chalmers sponsored some advertising in national media upholding the adequate wiring program. Reprints of the ads are available.

Inspector general

Idaho Chapter, IAEI, elected C. W. Davis, superintendent of light and power in Burley, as chairman of the Idaho Chapter at the recent annual meeting in Boise, April 29. He succeeds Don Baird, city electrical inspector of Caldwell. Story on the meeting will appear next month along with that of the Utah and Nevada Chapters.

New line-up

Electrical Contractors Association of British Columbia elected L. Irvine of Vernon, B. C., as its president for 1955-56. A Howie, Chilliwack, B. C., is first vice-president; C. Wear of Nanaimo, second vice-president; B. Hutchison, Vancouver, third vice-president; and J. R. Dooley, Vancouver, secretary-treasurer. Irvine succeeds W. Lockley of Mission, B. C., past president.

Wage hike

Wage scale for electricians went up 5c per hour May 1 in the Los Angeles area in accordance with an agreement signed last year. Negotiations start in August for next year's contract, according to Warren Penn, executive vice-president, NECA.

Jerked the rug out

"No more ridiculous than what you have demanded," said contractor negotiators to the union representatives recently. The reason—demands for a 7-hour day, 3-week vacation and many other fringes—was countered by demands from the employers that the union provide insurance comparable to workmen's compensation for employers, that time be deducted from the employee for that spent in discussions with the union business agent during working hours, that the union be responsible for employers' tools lost or stolen and that the union collect from each member 2% of his wages to be held as a vacation fund for employers.

Gripping story

A slimline lamp changer is now made by SGE Inc., 3348 W. 85th St., Inglewood, Calif. It was exhibited among other new things at a recent EMEA tabletop show in Los Angeles. With the single pin terminals, such a lamp changer is now possible on a long-handled device.

Bandwagon rolling

San Diego's certified lighting program began May 3 immediately following the Spring Fair. It is sponsored by the contractors division, Bureau of Home Appliances. Another area meeting in the eastern area is contemplated in May. A record attendance of 113 heard A. H. Gudie, Biddle Trade Bureau, and Walter Chapman, San Diego Gas & Electric Co., at the Escondido meeting in April.

Convention

National Industrial Service Assn.'s annual convention at the Statler Hotel, Los Angeles, opens June 9. Robert Gros, PG and E, is the banquet speaker. The technical topics cover a wide range of subjects of interest to motor dealers and repair shops.

Up-to-date information

A "Builder Bulletin" is now being issued by the Sacramento Municipal Utility District to advise contractors in all the building trades of new FHA rulings and other items of factual information.

Bid depository

A bid depository has now been set up in the Fresno area. It is located in the Builders Exchange in Fresno and is operated by Ray A. Buckley, who is also secretary-manager of the NECA chapter.

Read 'n write light

First use of fluorescent-corrected mercury lamps in a library is that at the University of California at Davis where the large library reading room was recently relighted. Westinghouse J-H1 fluorescent-mercury lamps were substituted for the 1,000-w incandescent lamps in 26 fixtures, raising the foot-candles from 10 to 30.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 96

SUBJECT: Preheating Truck Engines Electrically
CUSTOMER: W. S. Hatch Co.
TYPE OF BUSINESS: Petroleum and Acid Transport
SERVICE COMPANY: Utah Power & Light Co.
DATA SHEET PREPARED BY: R. M. Pizza

Electric heaters save one to two hours engine warm-up time per driver on fleet of trucks. Ease of control without watching is advantage

Electric preheating of diesel truck engines during cold weather to reduce starting time in the morning saves one to two hours waiting time for trucks of the W. S. Hatch Co. of Salt Lake City. A 2,500-w electric heater is installed in the cooling system of the engine, as shown, to warm the water by circulation and heat the engine block.

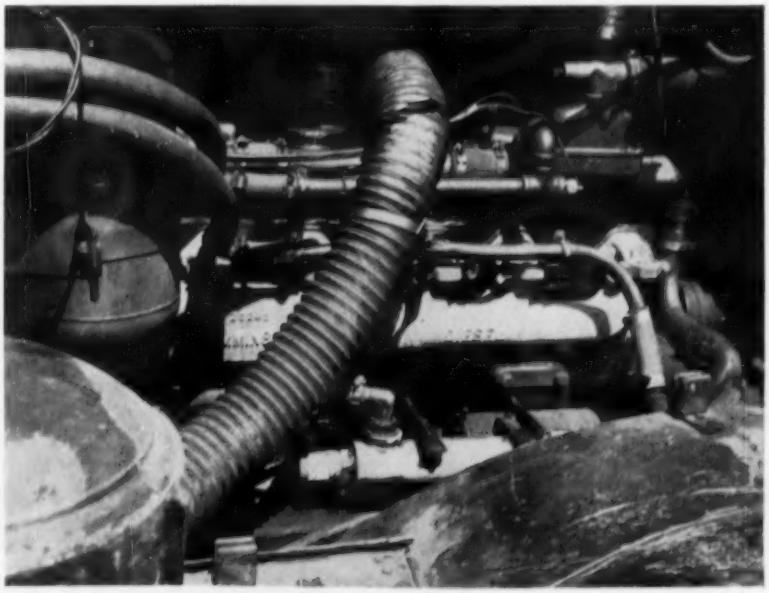
Heaters in the trucks are turned on by the night watchman about two hours before scheduled departure. This enables the driver to start his truck with ease and eliminates the delay in warming up the engine.

The 110-v heaters are manually controlled because of the heavy duty that would be imposed on a thermostat if they were to be made automatic. Ease of control without watching while the heater is in operation is one of the principal advantages of the electric heater. Flame-type heaters would be dangerous if used to perform this service.

Usually all 15 of the diesel trucks equipped with the heaters will operate some part of each day along their petroleum and acid transport route. Use of the electric preheaters results in 15 to 30 man-hour saving per day.

Connected load for the 15 trucks at 2,500 w each makes a total of 20 kw. Highest demand to date is 10 kw. Total consumption when heaters are in use is approximately 480 kwh per month. Eight plug-in points are provided at the main terminal.

Formerly the operators had to depend on auxiliary means for starting the engines, such as use of booster batteries. This caused the one- to two-hour waiting time per driver, first mentioned.



Electric heater for prewarming diesel engine is shown at lower center back of fender

ELECTRICAL WEST

Some Partners Are Willing

A NEW financing twist that completely offsets the charge that the federal power partnership program is a "give-away" has been proposed by three Northwest utility companies. Pacific Power & Light, Portland General Electric and Washington Water Power have offered to finance completely the power facilities of the John Day development on the Columbia in return for a long-term contract for the power output. The government would build, operate and own the dam and its appurtenant works. The utilities would put up the money for the power end; the government would finance the nonpower features.

Under the terms that have been proposed any power distributor in the Northwest—private, municipal, co-op or PUD—could participate by putting up its share of the construction costs. Each would share in the power output. A subsidiary organization would be formed to handle the contracts and to distribute the power.

With local interests willing and able to provide the financing that Congress has been loathe to commit, there is no longer any reason to dally in effectuating the partnership doctrine. The Northwest needs the power. Further delay is simply to invite a future power shortage.

How Are the Rainmakers Doing?

ONCE again large areas of the Pacific Southwest are threatened because of below-normal precipitation. Already during the late winter and early spring months power supplies from many of the major hydro systems of the entire West have been seriously reduced by lack of water. From the Columbia to the Colorado the moisture deficiency has been acute.

All of this tends to focus increasing hopes on the possibilities of cloud nucleation as a means of increasing precipitation. Probably nowhere in the nation have there been more diversified and unrelated experiments in cloud seeding than there have in the Western states. And if one may judge from the lack of tangible information, nowhere have the results been any more inconclusive. Whatever the reasons for secrecy, there is a crying need for complete frankness in reporting results and correlating observations and experience. The recent report of the negative results obtained in the weather-modification experiments financed by the Navy emphasizes the need for early determination of the success or failure of the twenty-five or more tests conducted here in the West.

The National Advisory Committee on Weather Modification set up almost a year ago should do something about discharging its responsibility—to find out who is doing what, under what conditions and with what results. Whether favorable or unfavorable, the answer is needed now.

Muscles For the Mighty Atom

FAST-MOVING developments lend assurance to the fact that the mighty atom is going to turn electric generators on an economical, practical basis sooner than the industry has believed possible.

Science hasn't said so that emphatically, but the enthusiasm at a recent atomic energy conference in San Francisco spoke much louder than words. The eager determination of 581 people to learn all they could about everything they could in regard to nuclear fuels for generating stations was the crystal ball showing the reality.

Strangely enough, there was little information given that would encourage confidence. They heard about experiments that aren't yet altogether successful. Much was said about factors that increase the cost of nuclear-powered generation but little about economies. Nobody attempted to deny that there are many important dangers in handling nuclear fuels. And those attending couldn't ignore the number of times great scientific minds had no conclusion to offer except "we don't know."

Yet, when the talking was all done, and with the unknown still overshadowing the accepted facts, the atmosphere was still

EDITORIAL VIEWS

charged with the quiet confidence that the job was going to be done, and that it would be done because "we're the ones that are going to do it."

Surely this attitude is the same as that of earlier pioneers in this business who refused to admit defeat or to be deterred by technological and economic obstacles. Instead they forged ahead combining invention, initiative and enterprise to build a great public service industry.

Lighting Needs Recruits

IF the glamour fields—guided missiles and electronics, made so by comic books, popular fiction and TV programs—are attracting away from the power field those too few students who decide on engineering as a career, then the lighting part of the electrical engineering field suffers more than all. Lighting courses in the universities that have provided them are in danger of dying out by default. So warned Prof. Dan Finch, University of California department of engineering, himself a regional vice-president of the Illuminating Engineering Society.

Even with the more complex problems of engineering involved in the application of the new light sources and the tremendous potentialities still unexplored for the use of light in architecture and agriculture, he said, there is no evidence of such a future being brought to the engineering students. No one from the lighting manufacturers is coming to the universities to coax these students into lighting although the interview schedules set up for industry to contact students with offers of jobs swarm with agents of other lines of business. If there is a demand for illuminating engineers it will have to be made known.

Professor Finch went so far as to say that the seeking to interest students in this work should begin at high school level in order to stimulate more students to think of engineering and particularly of lighting as a career of fascinating possibilities. He urged those in the lighting business to prepare literature, conduct tours, address school meetings, conduct student meetings and offer fellowships and scholarships. The light must be kept burning! That which gave birth to the industry must be kept alive.

TRADE unions have evidently embarked on a planned campaign to unionize the professional engineers of America. AF of L President George Meany in a recent article entitled "Engineers Need Unionism" told his readers that "more and more engineers are turning for assistance to the recognized union composed exclusively of men and women working for wages and salaries in the engineering profession." CIO President James B. Carey has hailed the responsibility of action and cooperation between a local of his union and an engineers' union in a recent strike as "a new high-water mark in the trend toward collective action by professional engineers." These expressions prove what we have long contended—that there is no half-way mark in the unionization of the engineering profession. We will either maintain our professional standing as individuals, working through our engineering societies and associations, or we will go all the way down the path of unionism . . . This effort of the labor group to unionize our profession bodes no good for the engineers of this nation, because of its deteriorating effect on their creative initiative . . . The proposition that engineers can have "professional unions" is wishful thinking. Engineers who indulge in "professional unionism will shortly find themselves in the category of unionized skilled labor, no matter how highly stated their initial motives might have been. We can meet this challenge with resolute determination, or we can dodge the issue and watch the disintegration of a great and noble profession. I have no doubt of our choice.—Clarence T. Shoch, president, National Society of Professional Engineers.

Marguerite Fenner, director of home economics for Pacific Gas and Electric Co., at her desk in the new home economics department headquarters. Picture of the general office area at right shows arrangement of lighting units over working areas. Kathryn Moon, staff home economics writer, is at the desk. Door at right leads into Mrs. Fenner's private office

Home Economics Department is

Designed to Serve the Industry

To serve the industry better and to provide complete facilities for conducting its home service program, Pacific Gas and Electric Co. has moved its home economics department to a building of its own at 540 Bush St., San Francisco. In this company-owned building, remodeled from ground to rafters to convert it from a display shop, are the offices of Marguerite Fenner, home economics director, and her assistants and a completely equipped kitchen with small dining area.

Here the company can carry on its cooperative program with manufacturers, distributors and dealers; give small luncheons for industry people, test and prepare for cooking schools; train home economists; do the photography for the color slides, which are a part of its mass education program. Division home economists can use the kitchen to get the feel of new equipment, which is on consignment and will be rotated among manufacturers.

Since the quarters were specifically designed for their purpose, they give the effect of a home without detracting from their utility as a business office. Taken to show specific details, the accompanying pictures cannot begin to depict the over-all charm and efficiency of layout.

The working area includes 1,160 sq ft, including a 22x20-ft kitchen; 20x14-ft reception room; 16x14-ft private office. Appropriately California agriculture is featured in prints, fabrics and paper.

The kitchen was laid out with a view to the various demands that would be made upon it. One of these is storage of food and equipment and preparation for cooking and homemaking schools (PG and E conducted 133 last year in cooperation with dealers, Northern California Electrical Bureau, Gas Appliance Society, newspapers, radio and TV stations, with an attendance of 70,776). Another, already mentioned, is to provide the setup for the color slides that are used by company home economists to reach customers in small or isolated communities where live schools are not feasible. Still others are to permit staff demonstrations and conferences with members of the industry. The kitchen is not for the general public, which will benefit indirectly.

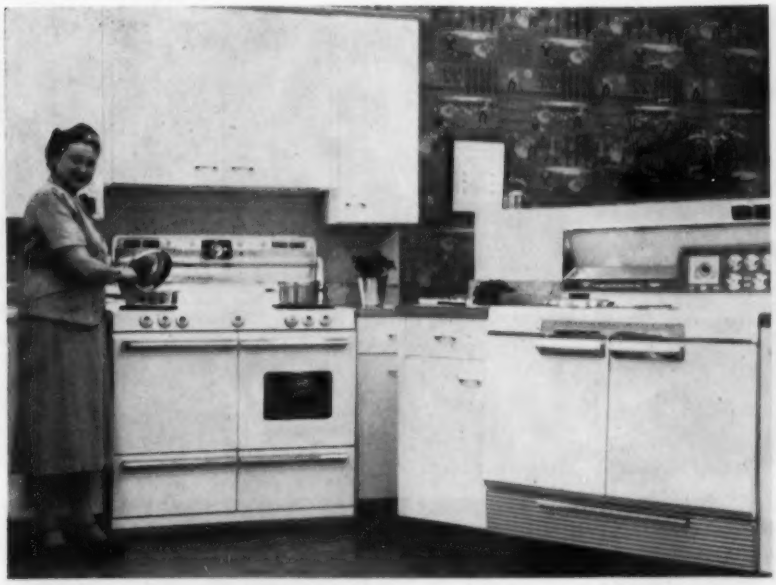
Rotation of the equipment has a two-way benefit. It gives company home economists the opportunity to work with different makes and permits every manufacturer to display his appliances.

At the present time major electric equipment includes an 11½-cu-ft G-E upright freezer; Westinghouse de luxe combination freezer-refrigerator; Frigidaire range with double oven; Hotpoint disposal, towel dryer and dishwasher. The kitchen is also fully equipped with small appliances.

The electric range is set against the room divider shown in the pictures. This island was specially built so that it could be used to close off the kitchen area from the dining space but also could be moved out of the way easily for staff demonstrations or photographs. It is 52 in. high to take care of the high backsplashes on modern ranges and is built on a steel frame with large casters. The range has a 6-ft connecting cord and outlets are arranged to take care of changes in the setup.

The entire area is heated with Thermador electric units recessed in the walls. A total of 18 kw is installed with 9 kw in the kitchen, 5 kw in the reception room and 4 kw in Mrs. Fenner's office.

The modern lighting serves as an example of well-planned illumination that could be adapted to home use. In the kitchen, which has 90 f-c, the lighting is an integral part of the ceiling design. New shallow, large-area, low-brightness, ceiling-mounted units extend around the perimeter and over working areas. They give soft, shadowless illumination with plenty of light on vertical surfaces. De luxe warm white fluorescent lamps are used to give excellent color rendition of all foods through the complete spectrum from beets to eggplant. The additional color



Cleo Filsinger, San Francisco division home economist, at work in kitchen. Island has been pushed back for this picture, allowing electric range to be swung out of the way

Evalyn Vaughan, home economist in the general office, uses some small appliances

at the red end of the spectrum is flattering to complexion tones.

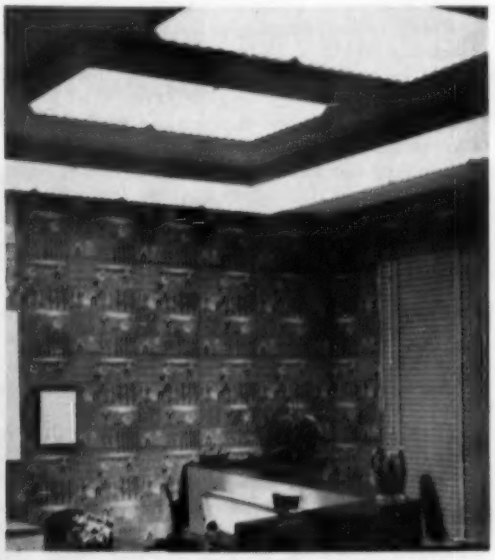
In the offices, lighting units were installed over working areas instead of in the center of the ceiling, giving 50 f-c on each desk. One picture shows how arrangement was varied to take care of desk position.

Primary aim of PG and E's home economics program is to build load and to increase sales of new appliances and greater use of those already owned. Secondary objective is to build and maintain good customer relations.

The company's lines cover an 89,000-square-mile area, with more than one million homemakers. If it is hoped to contact these homemakers personally, at least occasionally, a program of mass promotion and education is the only answer within the realm of resaonable cost, Mrs. Fenner points out. While priority is given groups of adults, youth organizations, schools and home service work are not completely ignored, she says.

In 1954 company home economists made 108,439 field contacts, including 1,388 group meetings with total attendance of 106,874, and 1,565 individual contacts. Cooking schools, equipment demonstrations, and radio and TV appearances are a part of the program.

To carry on this program the company has 11 home economists, eight assigned to the eight larger divisions and three in the general office department, one of whom serves the five smaller divisions. With such a big job to be done by comparatively few people, PG and E's new home economics department will fill a need.



A section of kitchen at left shows the island in place to close off the dining area, which is adjacent to the window shown in picture at right. Picture at right also shows lighting, tops of divider and electric range. Table edge can be seen at far right, desk at left

Left above: LeRoy Kiefer, head of the exhibit design department, G-M styling section, shows food freezer in Kitchen of Tomorrow to Ruth Whiting, Frigidaire Division, Dayton. Above right: Betty Smith and W. H. Baldwin, branch manager, Frigidaire's Oakland office, inspect fold-back surface units in Kitchen of Today. Lower right: parts of refrigeration and cooking and mixing areas in tomorrow's kitchen. Equipment can be used also from patio

What's in Store

Shown in the West as part of the General Motors Motorama of 1955, this year's Frigidaire Kitchen of Tomorrow is even more breathtaking than the 1954 version. Designed for near effortless indoor-outdoor living, it is laid out in areas; has in addition to the kitchen itself, play and dining areas, a patio, utility center for laundry appliances.

To show that many of the conveniences can be had now, Frigidaire brought along a Kitchen of Today with this year's Motorama. Following are only a few of the features:

Refrigeration center, with four waist-high modular units extending along a 12-ft wall. Included are a beverage cooler, ice maker, food freezer-refrigerator, roll-out storage cabinet.

Island sink with food disposer and automatic dishwasher. Chopping block is push-button controlled.

Cooking and mixing center, with access from patio as well as kitchen. Duplicate controls for oven and surface units permit supervising the cooking from either side. There is a circular sink for showering vegetables. The concealed rotisserie has a hydraulic lift to bring it to working level.

Meal-planning center, with a telephone that will answer and record messages; can be operated with a wave of the hand. The TV receiver has remote controls; will receive regular programs as well as pictures from front door, play area and nursery. A communication system reaches all parts of the house.

Motor-driven serving cart; travel tray that moves on overhead tracks to move heavy or bulky things.

Ceiling of light fabricated from more than 3,000 pieces of aluminum and illuminated by fluorescent tubes.

Almost everything operates by push button or touch or wave of a hand. Color plays an important role. The kitchen floor is black, cabinets are in shades of pink, mauve, white and charcoal.

Show Uses Puget Plan

Patterned after the plan set forth by Puget Sound Power & Light Co. in its booklet, "Cooking Can Be Fun," a two-day cooking school and appliance show put on at Bremerton, Wash., drew 2,726 housewives, more than 25% of those living in the city. Basis of the plan is to stage a diversified program that will hit the fancy of everyone.

The Bremerton *Sun,* daily newspaper, sponsored the school and handled the publicity. A recipe contest that ended about 10 days before the school opened netted more than 1,000 entries. The prize winner personally demonstrated her recipe on the first day of the show.

The civic auditorium was chosen as the location because it has an anteroom that could be used for dealer displays.

Each person attending the show was given a ticket to qualify for door prizes. On it she was asked to check appliances owned and the one she planned to purchase next; to give name, address and phone number.

All 13 major appliance dealers in the city cooperated in promotion and with equipment and prizes. Puget Sound displayed prizes in its office window.

Among utility people cooperating were Willard Farsje, Puget's Western division sales supervisor, who was manager of arrangements; J. L. MacDonald, division sales manager, who in the opening address dramatized advantages of electric living and discussed the all-electric rate; Mrs. Edith Rauch, home service director, who conducted the cooking program.

ELECTRICAL WEST Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

May 1955

Spring fairs took the stage last month with built-ins and color getting the spotlight. The continuing trend toward built-ins was observed at San Diego, where the Bureau of Home Appliances put on its 11th Annual Spring Fair late in the month. Color in kitchens and home appliances, color and "no-hands" TV were other features of this popular show, which will be reported next month. Built-ins also dominated the Fresno, Calif., exposition sponsored by the Home Builders Assn. of San Joaquin Valley, attended by more than 20,000 in four days, and the earlier Oakland Home Show, mentioned last month.

Fair time

TV, Radio and Appliance Dealers Assn. of Bakersfield, Calif., held its annual Spring Festival April 18-22. Member stores remained open each night until 9 o'clock. Tickets to be filled out with name and address and giving a chance at the prizes were used by the stores to build up prospect lists. Joe Sonderegger, general manager of Booth's TV, Radio & Appliance was in charge of arrangements.

Also at Bakersfield

With a Western theme and featuring new products, the Fourth Annual Electrical Home Show of Sacramento Valley Electrical League is set for May 19-22 at Memorial Auditorium. A Western Cooking Festival will be held in the auditorium's Little Theater during the afternoons, a Fashion Parade in the evenings. Added drawing cards are an amateur talent contest with a free trip to Hollywood for the winner; broadcasts by TV personalities from a studio on the main exhibit floor.

Sacramento's to come

Los Angeles Home Show, a nonprofit organization sponsored by the construction industries, last month filed a $500,000 damage suit in Superior Court against Barker Bros. for using the name "Home Show" in advertising and publicity. Meanwhile it continued plans for its 10th Annual Construction Industries Exposition and Home Show scheduled for June 9-19 at Pan Pacific Auditorium. One of five model homes to be featured is the "Home With a Heart," which is circular in plan with the kitchen as the heart. Another is the Tenth Anniversary Home, all-electric and in contemporary ranch-house design.

Show will go on

With even greater participation than at its successful 1954 show, Humboldt Appliance Dealers Assn. staged its second annual appliance show and cooking school in Eureka, Calif., May 4 and 5. The show was enlarged to include two afternoon and two evening performances. Sponsors were PG and E, Eureka Newspapers Inc., 14 appliance dealers, 25 cooperating merchants and other groups. Advance publicity plugged show features; stressed the many prizes being offered.

Even bigger

Appliance demonstrations by Arizona Public Service Co. home service advisors, 60 display booths, 25 prizes, topped by a two-week trip for two to Mexico, were highlights of the Fifth Annual Spring Fair at Phoenix Fairgrounds April 22-24. — At trip at Phoenix

Because of overlapping dates and inadequate facilities, Los Angeles Trade Fair canceled its seventh Western Housewares Show, tentatively scheduled for August. George Pascoe, general manager, explained that it could not stage the housewares show concurrently with the California Gift Show because of lack of facilities; could not ask buyers to come to two shows, staged one week apart. — Canceled

Other shows coming up: First annual Home Laundry Service Seminar and Trade Show, sponsored by Appliance Parts Jobbers Assn., Cosmopolitan Hotel, Denver, May 18-20; Western Summer Market at the Merchandise Mart in San Francisco, July 18-22; 12th California Lamp & Picture Show, Biltmore Hotel, Los Angeles, July 10-14; Exposition of Modern Living, sponsored by Northern California Electrical Bureau and Gas Appliance Society of California, in Oakland Exposition Building auditorium, Oct. 1-9. — Others coming

Frank K. Runyan, who announced his semiretirement after 24 years with the Western Merchandise Mart at San Francisco, took his new post as its management consultant and associate manager on May 1. A. Cameron Ball, who joined the Mart staff in 1935, succeeds him as president and general manager. — Change at Mart

"Retailing today is a fight for survival and the right to profit must be earned by intelligent merchandising," Emerson Dole, Wichita, Kan., dealer and NARDA vice-president, told members of the Rocky Mountain Electrical League at the recent Spring Conference in Denver. "If a discount house is handling the same brand purchased from the same distributor, you are handling the wrong brand and buying from the wrong distributor," he continued. He believes the solution to discount house competition is to choose a reliable product and distributor, stick by them and believe in them, use creative selling against all types of competition. — Fight for survival

Award winners at the Edison Electric Institute Convention in Chicago included these from the West: Portland General Electric Co. won the George A. Hughes trophy presented by Hotpoint for outstanding promotion of electric water heaters. Washington Water Power Co. won first prize in the George Westinghouse award for home laundry promotion. Arizona Public Service Co. received the Laura McCall award for its home service program. PG and E won third prize in the Frank Watts award given by the Farm Journal. — Awards in West

A booklet telling how to conduct a successful cooking school has been prepared by Puget Sound Power & Light Co. How to go about making the arrangements, what to do about contests, where to find advertising prospects are covered; suggested program, advertising and news stories given. One school patterned after the plan is reported on p 86. — Cooking school manual

Portland General Electric Co. has made its 65th annual report a salute to the "PGE Homemaker." A plastic overlay on the cover pictures Grandma over the washtub, washing dishes by hand, serving turkey from a wood range; turns to show the 1955 homemaker operating the modern counterparts of Grandma's equipment. Illustrations throughout emphasize the part electricity plays in the home life of PGE customers. Last year residential customers took more than half the company's electric output. — Salute to homemaker

El Paso Electric Co. has moved its dealer counselor and home service personnel to new offices on the seventh floor of its Electric Building. An auditorium with all-electric kitchen is in charge of Mrs. Dolores Howell and will be available to dealers for demonstrations and meetings. Karral L. Stevens, recently added to the staff, will work with local distributors to encourage builders, plumbers, contractors and others to install electric water heating and other appliances in new homes.

New quarters at El Paso

California-Pacific Utilities Co. reported a 47.5% increase in dealer appliance sales for the first quarter of 1955 as compared with the same period in 1954.

Dealer sales are up

Arizona Public Service Co. and Arizona State College at Tempe are co-sponsoring a college-accredited Home Lighting Workshop May 31-June 4. Planned as an annual activity, the course is designed for many different groups--teachers, lighting and color consultants, designers, home furnishing consultants and others interested in residential lighting. It is hoped that home lighting will become a required study in Arizona high schools.

Have lighting workshop

Pacific Power & Light Co. is conducting a tie-in ad contest for dealers. Kimmel's Home Town Hardware & Appliance of Tillamook, Ore., was March winner of $25 for a tie-in with the company's ad on electric dryers.

Tie-in contest

With more than 85,000 electric ranges on its lines, many of them from 15 to 40 years old and about 80,000 old-fashioned flame-type stoves in the area, Utah Power & Light Co. is pushing a range and water heater campaign in April and May. It is scrapping old trade-in ranges and water heaters to remove them from the used market; is channeling all trade-ins and sales through local electric dealers. Customer allowances of $25 on old ranges and $35 on old water heaters will be returned to dealers by the power company if campaign regulations are followed.

Time to scrap

Snake River Valley Electrical Assn. reports lists of low-power users have been compiled for Idaho Power Co. trading areas. Users with 100-200 kw average and users of more than 200 kw without approved water heater service are included.

Low users listed

An award for good kitchen planning is being offered by Woman's Home Companion to appliance dealers. Any NARDA member is eligible and plans for remodeling or new construction will be considered, provided they are done by a dealer. Entry blanks are available from Bernice Strawn, Home Equipment Editor, Woman's Home Companion, 640 Fifth Ave., New York City.

Award for plans

A contest for outstanding contribution by electrical leagues to the industry gift promotion campaign is being sponsored again by NEMA. Entries should tell how the league program is coordinating with the industry's year-round electric housewares promotion; should cover the period July 1, 1954, to June 30, 1955; are to be sent to the Electrical Leagues Contest Editor, Electric Housewares Section, NEMA, 155 E. 44th St., New York 17, postmarked not later than July 5.

Housewares award

On grounds that it unlawfully delegates power to fix prices and fails to provide any standards of guidance for such fixing, Oregon's fair trade act was ruled unconstitutional by Multnomah County Circuit Judge Lowell Mundorff. The ruling was made when the court refused to issue an injunction asked by G-E against a consumer sales agency. . . A new law, effective in Utah May 10, makes it illegal for merchants to reduce prices by use of trading stamps.

Fair Trade

Celebrating its 50th anniversary, Hotpoint is offering a dealer tie-in Living-Conditioned Homes contest, with $2,000,000 in prizes. Top winners nationally will get completely decorated, landscaped and furnished homes, four of them to be awarded in different sections of the country. Second prizes are all-electric kitchen-laundries, 50 of them. In addition, each participating dealer will award one appliance in his local trading area. One of the four pilot homes, to be used in promotion, is at Menlo Park, Calif. According to V. E. Koch, manager, San Francisco district, for Hotpoint, there are some 25 replicas of this pilot home up and down the Pacific Coast and all will be open for public inspection. Local utilities, builders and noncompeting home products manufacturers as well as dealers are tying in with the program. Participating dealers are offered a promotional package, with one Hotpoint appliance, entry blanks and other material announcing his store as contest headquarters.

Anniversary contest

Norge dealers in the West last month received first-quarter installments on a new-type bonus, which returns to them 2% of their appliance invoices. At San Francisco, Leo J. Meyberg invited dealers to headquarters, where a corral had been built for the occasion and staff members were in Western gear. There was also a chuck wagon with hot dogs and coffee for everyone. As each dealer had his picture taken and got his check, he passed by a display of new models for sale during a spring campaign featuring high trade-in allowances and new customer premiums. According to Herb Atwater, white goods division manager, dealers were placing orders as well as receiving checks. At Los Angeles, Charles P. Culbert, v-p in charge of sales, Sues, Young & Brown, said that more than 268 dealers received payment in its Big Pay-Off open house.

Get bonus checks

A three-month electrical living promotional campaign has been launched by the electrical appliance distributors of Honolulu, under guidance of the Hawaii Chapter of PCEA. Slogan is "Switch to All-Electric and Enjoy the Difference."

Operation switch

Now available is a new type of paint, called Colorage, developed by the A. C. Horn Division of Sun Chemical Corp. to match the new G-E colored appliances. In addition to the porcelain finish, there is a semigloss paint for walls, woodwork and ceilings so users can "mix or match" colors.

Mix or match

The industry is again cooperating in a campaign to inform people of the hazards of leaving discarded ice boxes, refrigerators and other airtight cabinets where children can crawl into them.

Danger told

G-E has named Union Hardware & Metal Co., Los Angeles, as distributor for its electric housewares, fans, vacuum cleaners and heating pads... E. C. Wenger Co. has opened a wholesale TV and electronic supply house at 575 10th St., San Francisco. . . Motorola held the first of two sales managers conferences at Broadmoor Hotel, Colorado Springs, in April... Associated Radio Distributors, San Francisco radio parts house, has been made distributor for Admiral radios in northern California.

Manufacturer briefs

Norge has appointed Frank Coyle as Western representative of its builder sales division, with headquarters in San Francisco...Broan Mfg. Co. has made the Keeler, White Co. its sales and warehousing representative in the States of California, Nevada, Oregon, Washington, Idaho and Montana. The company's electric fans and heaters may be secured from warehouses in San Francisco, Portland, Los Angeles and Seattle...Edward Marten has been named G-E television-radio specialties sales manager for Westinghouse Supply in Vernon, Calif. He had been with Meyberg in San Francisco.

More briefs

A MESSAGE TO AMERICAN INDUSTRY • FIFTH OF A SPECIAL SERIES

FINANCIAL AID TO HIGHER EDUCATION

Business Help for Our Colleges A Job for All Business Firms

IN recent months, individual business firms have announced the adoption of a variety of plans, both imposing and ingenious, for financial aid to higher education in the United States. In doing so, they have taken a lead in dealing with a problem of transcendent importance both to the business community and to our nation as a whole.

Previous editorials in this special series have shown that:

1. Our colleges and universities, and particularly the independent, privately endowed institutions, are in grave financial difficulties.

2. These difficulties promise to become much more acute in the years immediately ahead unless extraordinary steps are taken to relieve them.

3. A financially crippled system of higher education is a major national menace.

If, however, the business community is to play an adequate part in helping our colleges and universities financially, the plans adopted by business firms thus far constitute merely a beginning and a set of guide posts. What is required is a general movement on the part of business firms to go to the financial aid of higher education. Such a movement would involve a myriad of individual company plans which, in the nature of the case, cannot be expected to bring great renown or publicity to their sponsors.

Rescue Operation Is Feasible

For the business community as a whole it is feasible to make a major and possibly a decisive contribution to putting our colleges and universities back on their feet financially. One percent of business profits before taxes would do it. In 1954 business profits before taxes were about $35 billion. If one percent of these profits, or $350 million, were contributed to our independent, privately endowed colleges and universities it would enable these institutions (1) to increase the salaries they pay by $200 million a year, and (2) to provide $150 million more for modernization and maintenance of their establishments. In the opinion of competent authorities, this would put these institutions in relatively good working order financially, a process to which a matching grant of $50 million by the Ford Foundation for the improvement of faculty salaries will make a large contribution. It would add about one-fourth to their present annual outlay of about $1.4 billion.

Such a contribution from business would not meet the needs of the independent institutions for new buildings and equipment required to accommodate the great increase in college enrollment anticipated in the years immediately ahead. Neither would it relieve the financial problems of our tax-supported colleges and universities. As a group these institutions have fared better financially in recent years than the

independent institutions. But they also face grave financial problems, particularly in the provision of adequate faculty salaries. It would be far simpler, however, to solve the financial problems of the tax-supported institutions if the independent colleges and universities were back on their feet financially.

One Dollar Does Work of Two

The federal government exempts 5 percent of business profits from the tax imposed upon them if the 5 percent is devoted to religious, charitable or educational purposes. (Most profits are taxed 52 percent.) A contribution of one percent of business profits to higher educational institutions would exhaust only one-fifth of this allowance. It would bring to about two percent the total share of business profits going to both educational and charitable purposes.

In 1953, business firms contributed about $400 million, or slightly more than one percent of profits before taxes to educational and charitable purposes of all kinds. Of this total about $75 million went to educational institutions, mostly colleges and universities.

For some companies it is feasible to contribute more than the average contributed by business generally. Indeed, some companies not only utilize their full 5 percent of tax-deductible funds for charitable and educational purposes but go beyond it. For other companies in financial difficulties no contribution at all is possible.

If, however, those business firms for which it is financially feasible contributed one percent of their profits before taxes to our colleges and universities, the problem of adequate support for the crucially important business of higher education would be far along the way to successful solution. **In 1954 a contribution of one percent of their profits before taxes, or about $350 million, would have reduced business profits after taxes by only about half that amount. This would have meant a reduction of about $175 million, out of a total of about $17.8 billion of profits after taxes.**

Attractive plans to channel financial aid from business to higher education have been abundantly demonstrated recently. These plans, for the most part the creation of large corporations, have included not only a broad array of scholarship grants, but such ingenious arrangements as that by which a company matches with its funds the gifts its employees make to the colleges of which they are alumni.

A full array of these plans, some of which were discussed in an earlier editorial in this series, has been prepared by The Council for Financial Aid to Education (6 East 45th Street, New York City 17) and is available for the asking. Also, colleges and universities have established in most states and regions cooperative associations to help business help them. The Commision on Colleges and Industry (912 Kahn Building, Indianapolis 4, Indiana) distributes a directory of these associations. And, of course, the colleges themselves are always eager to discuss their financial problems with business people and suggest constructive solutions.

Only Small Start Made

The plans for business aid to education which have recently attracted national attention constitute the conspicuous sort of leadership which it is the privilege and opportunity of our great corporations to provide. But the job is too large to be handled by a small number of business firms, no matter how bold or ingenious their programs.

To put our colleges and universities back on a firm footing financially the help of the great rank and file of business corporations is required. All of them, large and small, have a crucial stake in seeing that this job is done. The future of America will be decisively shaped by what happens in and to our college classrooms.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

Experts in psychology, physics, optics, law enforcement and lighting explored the traffic problem as major feature of one . . .

IES Regional in Phoenix, Los Angeles

Regional conferences brought to grass-roots level the lighting progress in all fields and the increase of knowledge about light from the research and committee work of the Illuminating Engineering Society for the past year. There were three such conferences in the West in April, two of which are reported herein; the last will be next issue. First was that of the Intermountain region, recently formed. Its second conference, April 11-12, was held in Phoenix in a well and versatilely illuminated new public library auditorium.

Second in the series was that of the South Pacific region—its ninth conference, for it was the originator of these conferences. It was held in well-lighted Statler Hotel, Los Angeles, April 13-15. Between the two the national council of IES held one of its rare meetings away from headquarters, this one in Phoenix, giving many Western officers their only chance to attend one.

The troupe of nationally known IES celebrities then went north to the North Pacific region's conference at Harrison Hot Springs, B. C. In this group were IES President Duncan Jones of Montreal, A. Dexter Hinkley, executive secretary, Ruby Redford, editor, *Illuminating Engineering*, Dr. E. F. Lowry, Sylvania Electric Products, Salem, Mass., Eugene Beggs, Westinghouse Lamp Division, Bloomfield. Kirk M. Reid, General Electric Lamp Division, Cleveland, IES general secretary, attended both Phoenix and Los Angeles meetings and the council meeting. R. F. Hartenstein, IES vice-president, F. C. Winkler and C. W. McCormick came from the East for the council meeting which was also attended by regional vice-presidents G. B. Buck II, Denver, and Dan Finch, Berkeley, as well as John S. Walsh, San Francisco, a director, and Leonard Hobbs, past regional vice-president, as proxy for Blair Ploughman, Spokane.

Newest developments in light sources are always a dividend from these meetings. The three major lamp company spokesmen brought this intelligence.

Eugene Beggs of Westinghouse in presenting last national conference's progress report (which he did despite misshipment and later mixture of his slides, surmounted blithely) touched on most of them. He specialized however on the mercury lamps, introducing new 100-w, 150-w and 200-w sizes to complete the 400-w and 1,000-w plain and color corrected types.

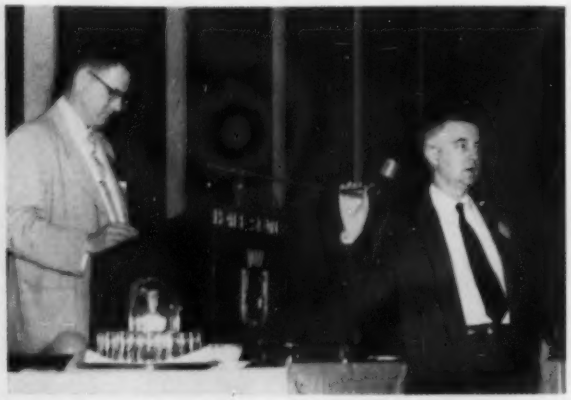
Dr. Lowry of Sylvania, after showing the improvements in efficiency life and color in fluorescent lamps leading to the rapid-start types which seem to the "the lamp of the year" (each year going all-out for some one type as the answer to all prayers), introduced a new "super de luxe" white, even richer in red than last year's de luxe although again with a loss in efficiency. He also showed a much brighter luminescent glass than he had shown at the Pasadena IES convention some years ago. In addition he sprang a luminescing panel of steel with a porcelain enamel that glowed as well as a rainbow of colors possible in luminescence. Roy

Whitnell Buck

Lowry Pres. Jones

Finch Krachenbuehl

Chairman Ed Blair watches Kirk Reid do his duty by Cleveland



San Diego Chairman Howard and Benjamin's Ben S. Benson Jr.

Bevan of Sylvania also talked on fluorescent lamps.

Kirk Reid of G-E ably defended the place of filament sources despite the glamour competitors, fluorescent and mercury. New were the more controlled beam sealed reflector lamp—as a new auto headlight and with an oblong beam pattern for floodlighting.

Luminous Panel

Luminous ceilings and panels seemed to predominate the thinking in both conferences. At Phoenix, where it gets hot, a panel of experts on "Lighting fixtures and fire rating" skated around the subject until the architect, Lloyd Pike, focused the beam on luminous ceilings. Frank Jones of Arizona Fire Rating Bureau gave the chilling answer that until UL tests satisfy that plastics have more fire resistivity anv sprinklered building installing luminous ceilings has to be derated for insurance. Other members of the panel, of which Bevan Jones, Arizona Public Service Co., was moderator, were H. H. Dinwiddie, Phoenix building inspector, and J. G. Platt, Holophane, Los Angeles.

Later David B. Bluford, vice-president, Luminous Ceilings Inc. of Chicago, gave an illustrated talk on the applications possible for this area illumination. The subject came up often at both conferences, many installations of it being shown in the examples projected. A highly significant idea closed the Los Angeles conference when John S. Walsh, PG and E, San Francisco, the last speaker, brought an example of a means that may become very potent to combat street reflections on show windows. A San Jose furniture store (story to come here soon) succeeded in overcoming strong daylight reflections by installing a luminous background and side walls to a test show window.

Outstanding session at the Los Angeles conference was the Thursday morning panel of 12 experts representing as many points of view of the problems of traffic, safety and lighting on streets and highways. Masterfully and wittily moderated by L. M. K. Boelter, dean of engineering, University of California, Los Angeles, he whisked the 11 others through expressions on their particular specialty then directed questions from the floor to them. It was the first time in IES experience in the West at least that such top authorities gathered at one time. Lack of space must defer a more complete report of the points of view expressed. The names and titles themselves suggest the approach of each.

Lighting and electrical engineer members of the panel included Boelter, Dan M. Finch, department of engineering, U of C, Berkeley; Kirk M. Reid, director street lighting, G-E Co., Cleveland; A. T. Nadeau, assistant director, bureau of street lighting, Los Angeles city; Gilbert A. Trosper, illuminating engineer, PG and E, San Francisco. Dr. Heinz Haber, physicist, Institute of Transportation and Engineering, UCLA; Dr. G. E. Mount, psychologist, department of psychology, UCLA; and Dr. Henry A. Knoll, dean of Los Angeles College of Optometry, brought their professional specialties into play. Representing traffic control were L. M. Braff, general manager, traffic department, City of Los Angeles; H. W. Sullivan, deputy chief commander, traffic division, Los Angeles police department. J. E. Havener, manager public safety department, Auto Club of Southern California, spoke on the business uses and importance of highways.

Neidhart Gibson

At Phoenix D. B. Johnson, street light engineer, Arizona Public Service, and Glenn Kiger, Phoenix city electrician, as well as the welcoming address by Mayor Murphy, told of the city's street relighting program.

For the Profession

President Duncan M. Jones and both regional vice-presidents, G. B. Buck II, of the Intermountain, and Dan M. Finch the South Pacific region, spoke on behalf of the profession of illumination engineering.

In addition to a report to the membership of the activities and the finances of IES President Jones cautioned all to guard the professional status of the society. "We are fortunate in that our membership permits a range that covers scientist to technician, professor and scholar, professional, executive and salesman . . . This very situation creates in the minds of some that we are not strictly a technical society . . . It is a cloud we should attempt to dissolve . . . No one should use the title, illuminating engineer, who is not strictly qualified or licensed to attach this designation to his occupation."

Something of his famous father's oratory shone in the inspirational message, "The Light of Your Life" that G. B. "Jim" Buck gave at the banquet in Phoenix. He also gave an insight into color as it is found and used in pigment and in plants and animal life and in light sources. This he illustrated at the Tuesday morning session.

F. Jones Dinwiddie Platt Pike B. Jones

Eugene Biggs

Dan Finch made a strong plea to the lighting and electrical industry to recruit more of the engineering students into the lighting profession. (See editorial.)

Another national figure in lighting education, Prof. John O. Kraehenbuehl, University of Illinois, endeavored to simplify lighting calculations that often baffle the practicing designer. At the Phoenix meeting he translated some of the erudite formulas into simple old cartographer's charts.

Other speakers from the East covered auxiliary equipment, industrial lighting, school and office lighting. Local talent ably filled the two programs to cover the other aspects of lighting.

J. Hugh McCulloch, once with Sunbeam in Los Angeles, now with G-E apparatus division, Danville, discussed the problems and evolution of ballasts and circuits for fluorescent lamps at Phoenix. At Los Angeles E. H. Salter, Electrical Testing Laboratories, New York, covered the developments being sought of standards for lamp and ballast performance, something that has been difficult and complex.

How the IES committees on both office lighting and school lighting standards are endeavoring to bring their recommendations in harmony was told at Los Angeles by John J. Neidhart, Westinghouse, Cleveland. Charles Gibson, California State Department of Schoolhouse Planning followed with examples of how the principles of the school building officials codes and IES standards have been applied to California schools. At Phoenix, F. Bischofberger, Public Service Co. of Colorado, described the Denver school relighting program that has now reached every school.

Henry B. Sargent, president, Arizona Public Service Co. spoke briefly at Phoenix on his company's power situation. C. Mobley of Tucson GEL&P company told of the effect of power factor. And Arizona Public Service's dynamic Jerry Whitnell not only general managed the successful conference in Phoenix but he flew to Los Angeles and participated in two sessions there.

At Los Angeles other contributors to the fine program included Benjamin S. Benson Jr., Benjamin Electric Co., Des Plaines; W. D. Jones of W. J. Moran Co.; Richard Riggs, Crouse Hinds; George Leyes, Westinghouse; William Shalda, manufacturer; Carleton M. Thompson, San Diego Gas & Electric Co. General Chairman F. Jack Rohring, Southern California Edison Co., and his committee deserve especial credit.

Contestants and winners in the two regional "My Most Interesting Lighting Job" contest: Upper, Intermountain region—Charles Bell, Southern Colorado Power Co., who made presentation for Anna Dean Berry of same company (3rd prize); F. Bischofberger, Public Service Co. of Colorado, presentation for Lyle M. Bailey, Sechrist Mfg. Co., and Ellis Gilchrist, consulting engineer, Denver (2nd prize) and winner, David M. Demaree, electrical engineer, Phoenix. Below, South Pacific region—Harold Stahn, L. A. Dept. Water & Power, chairman; Gordon Dovey, So. Calif. Edison Co., winner; Sidney Furniss, Coast Electric Co., San Diego (3rd prize) and F. H. Logan, Western Asbestos Co., San Francisco (2nd prize). Several Western chapters made no entries in the contest this year

Robinson Setterstrom

Duffy Hatch

Lanning Thrailkill

"Develop Your Own Power Supply"

"If you don't develop your own power supply and become independent of federal power, you will be out of business in 10 to 15 years." That emphatic statement was made by Kinsey M. Robinson to the group who attended a joint meeting of the Engineering and Operation Section with the Personnel and Safety Section of the Northwest Electric Light & Power Assn. held in Spokane April 13-15.

Robinson, president of the Washington Water Power Co., said that exercise of the preference clause would in a short time deprive the private utilities of the Northwest of practically their entire power supply and they would be out of business if they do not protect their interest. "If you do not develop your own power supply or if you are afraid of 4½-mill hydro, you might as well quit," he said. "Besides, you better recognize that you are going to have to install firming steam power."

As far as his own company is concerned, an active power development program is under way. They hope to start Noxom Rapids by midyear. As a member of the four-utility Northwest Power Co., preliminary investigation is under way on two Snake River sites that will develop 1,000,000 kw at a cost of $200,000,000.

Robinson said that the battle waged and won in the past five years by three Northwest private power companies—Washington Water Power Co., Pacific Power & Light Co. and Puget Sound Power & Light Co.—from going over to public ownership had inspired confidence of investors and that financing was no longer a problem. "We must go forward and keep that confidence," he said.

W. J. Mosley, coordinating engineer, Governor's Power Policy Committee, discussed future area-wide power supply problems. He said the loads and resources will be about in balance for the next five years but that 880,000 kw of new capacity will be needed in 1960-61 in addition to the 3,600,000 kw of new generation now under construction. By 1963-64, requirements will have risen to 2,560,000 kw.

36 Projects on List

A willingness has been expressed to develop 36 projects that could add 6,700,000 kw by 1963-64. For various reasons the list boils down to 20 projects that might provide in excess of 3,000,000 kw for the 1960-61 loads. There are only five of these presently advancing on a schedule that would help to remedy the 1960-61 situation. These five would produce 580,000 kw, leaving a further requirement of 300,000 kw. Mosley said that if as little as 15% of the remaining proposals can be cleared the 1960-61 situation can be met. Fish and wild-life problems enter into practically every sizable project proposed but it is hoped that research and cooperative studies now under way will resolve these and other problems.

Engineer's Responsibility

Theme for the record-attendance meeting was set by Association President R. C. Setterstrom when he said the engineer's responsibility is to find ways of "serving larger loads at lower costs." He said it is encouraging to know that our executives are behind us and advised the group to formulate a dynamic program and choose strong people to execute it.

The Personnel and Safety Section under the chairmanship of Peter Piper, Washington Water Power Co., contributed to the joint meeting by presentation of two appropriate skits, one dealing with selection and employment of utility engineers and the other on designing safety into operations.

Power Production

R. P. Mortell, Chairman

Speaking on atomic power production C. E. Cannon, Washington Water Power Co., said the supply of hydroelectric energy in the Northwest is by no means inexhaustible and that eventually steam plants will be necessary to carry base load in some areas. When that time comes, nuclear power plants will no longer have to compete with hydro but rather with steam from fuel available at that time. It is entirely possible that high capacity factor operation, together with expected improvements in nuclear power plants, will make power from the atom economically attractive as a future source of energy in the Northwest, said Cannon.

Discussion showed that no economi-

Green Brown

Leever Brewer

George Hannum

Russell Ball

cally satisfactory way has been found to the problem of converting old, small hydro plants to semiautomatic operation. Consideration has even been given to shutting down such plants because of high operating costs. It was brought out that although a utility can afford to spend 10 times the annual savings in pay roll, nevertheless the cost of protective equipment is prohibitively high. A number of shortcut practices were described but it was the consensus that the problem is still unsolved.

House Heating

Delmar L. Brown, Chairman

Electric space heating was a topic of major discussion at the meeting. In connection with the heat pump at least one conclusion was reached and one new basic approach presented.

After analysis of a full year's operation with two package-type heat pumps with auxiliary resistance heating, Portland General Electric Co. has concluded that such a heat pump is not the answer under Portland conditions. Summer cooling load was less than 1% and annual load factor was low. Annual load factor on maximum demand at time of system peak was 22% for a 3-hp unit and 19% for a 5-hp unit for the year 1954. This compares wtih an approximate 30% load factor for unit resistance heating determined in PGE's 1946-47 resistance heating tests. However, the utility will continue tests on the two units and reserve final conclusions until data have been secured for a longer period of time.

A new and promising approach to the use of the heat pump was presented by A. B. Martin, Washington Water Power Co. He proposes using a small heat pump that would handle about 85% of heating requirements and then automatically cut in an oil-burner booster. Such a unit would have annual load factor in the Spokane area of approximately 55%. Martin has seven such installations in operation that have fulfilled expectations. These are 1½- and 2-hp units using air wells, where practicable, as the heat source. Annual heating bill for the heat pump-oil combination is 10 to 20% less than for oil alone. This type of load, with annual load factor of more than 50%, is most attractive to the utility as compared with 26% for straight resistance heating and 12% for a heat pump with supplemental resistance heating.

Duane Olney, Washington Water Power, speaking on the effect of house heating on pool load, said that it had been found that a change from 35 to 34° adds 1.19 mw of average load and that going from 1° above to zero would add 1.92 mw. Corresponding peak change was 1.37 mw and 1.55 mw respectively. That is, temperature affected load added at 0° adds more average mw of energy than peak and thus affects system operation.

Electrical Equipment

P. F. Hargreaves, Chairman

Several members reported on 69- and 115-kv load break switches of the oil-poor type, stating in general that they were satisfactory but still presented a maintenance problem. Successful testing of a model operating in a vacuum was reported. Welding of aluminum buses seemed much preferred over use of connectors, in a discussion of that subject. John R. Conrad, S & C Electric Co., discussed load break cutout design.

Substance of other discussions was: Apparatus bushings have been standardized, 15 to 69 kv, but for higher voltages considerable differences in mechanical features will have to be agreed upon; the gas-oil seal type of transformer gas preservation seems to be preferred in all but the largest sizes where the automatic gas type is generally specified; more companies are going into high-voltage d-c testing of generator windings; early planning of substation locations and more landscaping, together with larger sites, were generally accepted as a means to less trouble in acquiring substation sites.

Caldwell Snow

Mortell Brown

Lewis Miles

Downing Hempel

McShane McMynn

Hargreaves Wald

Meters, Codes, Services
F. O. Wald, Chairman

A. L. Carvill, General Electric Co., reviewed watt-hour meter development through the years to the present 100-amp meter capable of metering very accurately the energy used in the modern home. In the discussion period, member-company practices as reported in the recent *Electrical World* survey were reviewed; also the new Spokane city code requiring heavier service entrance and an approved 200-amp meter socket for dwellings of more than 500-sq-ft area; average low load accuracies of the modern residential meter were reviewed in comparison with accuracies now obtained at extended load ranges on the usual residential meter.

Electronics
G. F. Green, Chairman

Experience of microwave users showed that this form of communication has as high a degree of reliability as any other means employed by utilities. Portland General Electric reported very reliable operation on a channel to Timothy Meadows reservoir site; Pacific Power & Light said reliability on its Yale-Merwin link using passive reflector was 99.9% with maintenance costing $.80 per channel-mile per month. G. F. Green, B. C. Electric Co., said that power deficiency was the weak point in a recent emergency on the B. C. system. He said that, in general, an engine-generator set is the best source of emergency power.

Transmission and Distribution
Cecil Brown, Chairman

W. R. Bullard, Ebasco Services Inc., made these points in discussing distribution problems: In future planning, be on the conservative high side; house heating is a factor to be considered in the Northwest; primary voltage of 13.2/25 kv is gaining favor; engineers should consider 23 kv when changing from 4 kv; why not 10,000-kva feeders at 12 kv and 18,000 kva at 23 kv?; use of copper equivalent for aluminum is unsound and has caused loss of money in design.

P. H. Light, General Electric, proposed using as a basis of determining the cost of transmitting power one ampere one mile. He said the method is simple, universal and has merit.

Howard Farley, NECA, presented a long list of good arguments why the utility should contract more of its construction work to the electrical contractor. F. W. Beichley, Westinghouse, said new homes have a built-in ceiling on wiring to limit full electrical usage and pleaded for more widespread support of the National Adequate Wiring program.

Dr. E. W. Greenfield, Kaiser Aluminum, and E. A. Casey, Anaconda, brought the group up to date on research on connectors and fittings and new developments in conductors.

Utilization
Gordon Hannum, Chairman

J. B. Hodtum, Allis-Chalmers, P. H. Light, G-E, and W. R. Bullard, Ebasco Services, discussed higher utilization voltages. Hodtum thinks 277/480 v will become standard for the higher voltage; that we will develop into two systems, one 277/480-v radial and 240/416 for networks. Light thinks the problem will be settled on the basis of economics. The 277/480-v system shows large savings. Bullard hopes for an ideal system that will serve all general-purpose loads. Autotransformers are a nuisance and he would like to see them eliminated in the ultimate system. From a long-range view, he thinks 255/440 v would be the ideal system with 250 v at the lamp socket.

M. D. Duffy, Pacific Power & Light Co., is chairman of the Engineering and Operating Section and M. F. Hatch, Washington Water Power Co., is vice-chairman. Glen George served as general meeting chairman. Inspection trips included Cabinet Gorge, the Kaiser aluminum rolling mill and a trip to the mines at Kellogg.

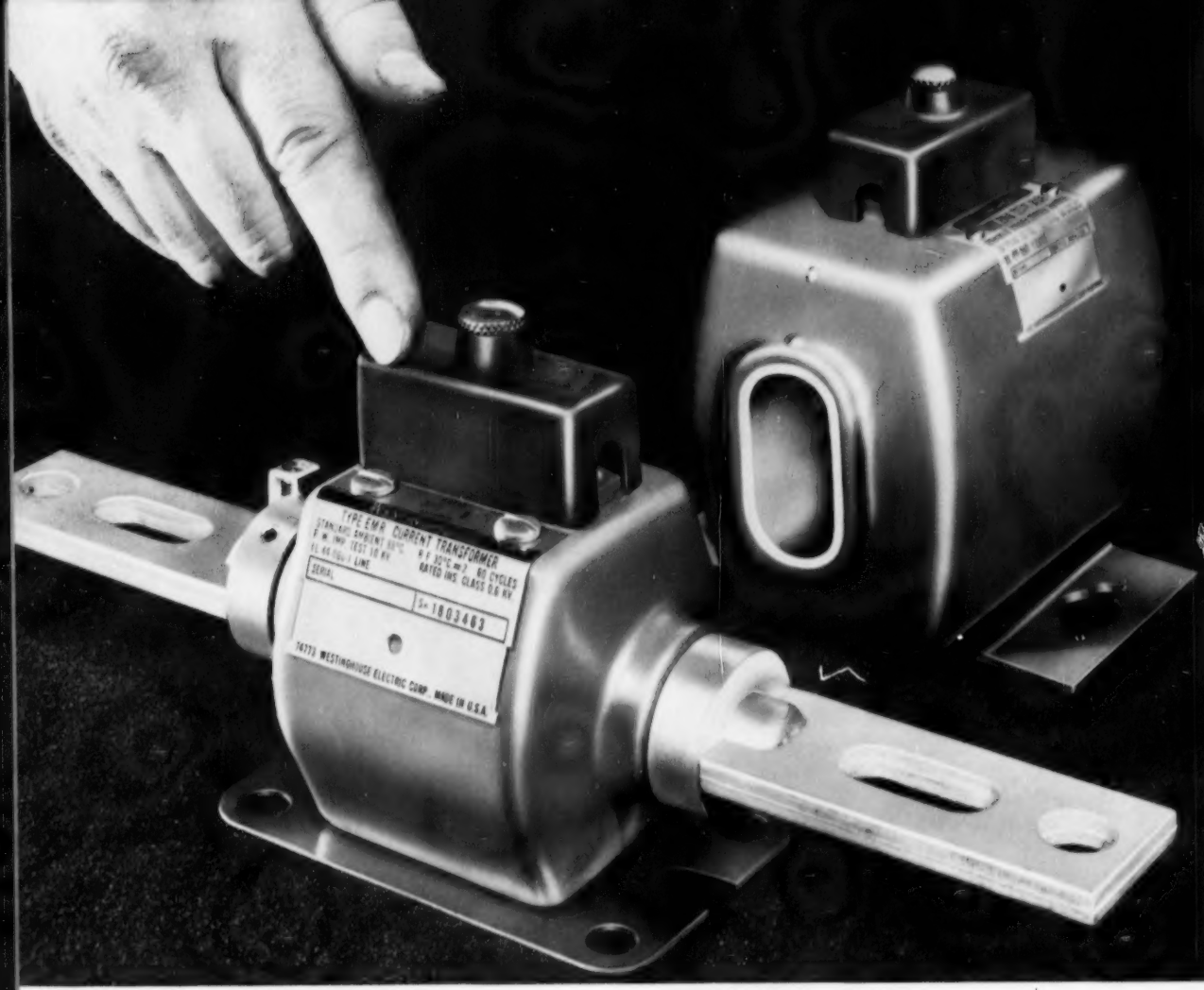
PCEA Convention Readied

Last details of the Pacific Coast Electrical Assn. annual convention at the Sheraton-Palace Hotel, San Francisco May 11-13, were being readied at press time. Notices with the full program had been sent to all members. Advance registration already indicates large attendance, according to Victor W. Hartley, managing director.

Among nationally known speakers on the program will be: Harold Quinton, president, Edison Electric Institute; Henry Sargent, Arizona Public Service Co.; W. V. O'Brien, General Electric Co., New York; Robert Gray, Cal-Tech; John K. Hodnette, Westinghouse, Pittsburgh; Dean F. E. Terman, Stanford School of Engineering; R. C. Setterstrom, president, Northwest Electric Light & Power Assn.; Dr. Weldon B. Gibson, Stanford Research Institute; Col. Alexander Heron, Crown-Zellerbach Corp.; Joseph F. Leopold, National Tax Equality Foundation.

• **The new Southwest Electric Conference,** which includes Arizona, New Mexico and Texas in its 10-state area, held its charter meeting April 3-5 in Chandler, Ariz. The organization will be informal, with no staff and no dues; will have one meeting a year, with attendance limited to top officers of participating companies. Henry Sargent, president, Arizona Public Service, gave the welcoming address. Other speakers included Gwilyn A. Price, Westinghouse president, on the engineer shortage; Harold Quinton, EEI president, telling of the big job ahead; J. W. McAfee, president, Union Electric, on nuclear power.

• **Lack of space** necessitated holding over until next issue reports of the annual meetings of the Nevada (at Ely), Utah (at Salt Lake City), Idaho (at Boise) and Montana (at Missoula) chapter meetings of the International Association of Electrical Inspectors. Likewise the North Pacific regional conference of the Illuminating Engineering Society.



NEW TYPE EMR (LEFT) AND TYPE EMO (RIGHT) CURRENT TRANSFORMERS

Polyester molded for lighter weight, longer life

Outstanding is the word for the new Westinghouse Types EMR and EMO indoor-outdoor current transformers for 600-volt service. They are lighter, smaller, more durable and more pleasing to the eye than any comparable units.

Both are molded of a polyester elastomer insulating material that has excellent thermal and dielectric stability—remains physically flexible at high or low temperatures. Both use exclusive Hipersil® cores—a major factor in their small size and superior performance. And both have rating factors of 2.0. The EMR and EMO (200/5 A.) have 0.3 accuracy classification at B-0.1 and B-0.2. The EMO (400-600-800 A.) maintains this accuracy also at B-0.5.

The EMR has a round primary opening and is available with or without a removable round or flat terminal bar. The EMO features an obround opening for use with multi-cable primaries. They may be installed in any position—on virtually any type of mounting.

For full details, call your Westinghouse representative, or write for B-6520, Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70749

YOU CAN BE SURE...IF IT'S Westinghouse

Engineers are shown checking control of this giant 330,000-volt circuit breaker, rated at 3-cycle interrupting, 15-cycle reclosing. This is the first of 18 assembled here in an average time of less than 5 days per breaker.

Helping the industry meet its growing loads

World's first 330-kv, 25,000,000-kva breaker installation

Electrical history was made at Portsmouth, Ohio, in the summer of 1954. There in the A.E.C. 330-kv switchyard, the installation of the world's first 25,000,000-kva breaker was completed—the first of 18 huge Westinghouse "Watchcase*" breakers of this rating now located in this station.

These giant breakers . . . an extension of the low-oil content "Watchcase" design . . . were assembled on their foundation in an average time of less than 5 days each.

Here are other outstanding advantages of this Westinghouse "Watchcase" breaker:

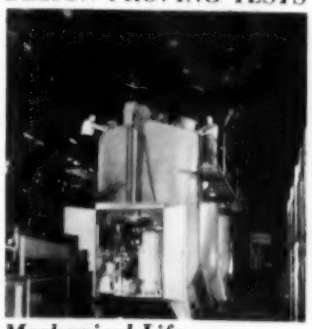
- It permits use of low-cost bushing current transformers and potential devices.
- It has a single pneumatic operating mechanism for simultaneous 3-pole closing.
- Condenser bushings eliminate radio interference problems.
- Every performance characteristic is fully proved by factory tests.

Integrated manufacture and unit responsibility . . . from idea to blueprint, from porcelains to contacts, from mechanism to interrupters . . . are the story of Westinghouse ability to help you meet America's power needs. J-97190

*Trade-Mark

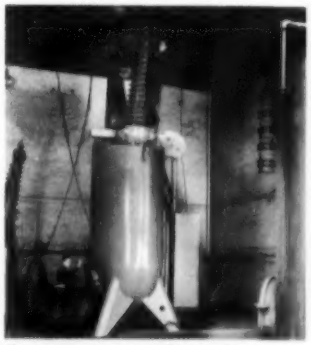
YOU CAN BE SURE...IF IT'S Westinghouse

DESIGN-PROVING TESTS



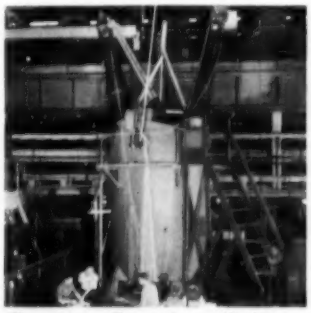
Mechanical Life

. . . proved by more than 5000 three-pole mechanical operations.



Interrupting Capacity

. . . proved by over 3000 interruptions in the High Power Laboratory.



Current-Carrying Ability

. . . proved by complete temperature tests with over 200 thermocouples.

Insulation Ability

. . . proved by hundreds of 60-cycle and impulse tests in the High Power Laboratory.

New, intermediate rating for drop-out type power fuses

It's the Westinghouse DBA-5—rated 1/2E to 200E with an interrupting capacity of 500,000 equivalent kva—available in 34½, 46 and 69-kv sizes in standard current characteristics.

This latest rating in the family of dry-type De-ion® boric acid fuses, developed by Westinghouse over 20 years ago, fills the operating requirement gap between the 4000-ampere I. C. DBA-1 and the 14,000-ampere I. C. DBA-2 (at 69 kv).

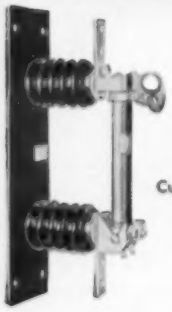
Exactly interchangeable in DBA-2 mountings, the DBA-5 provides a low-cost method of meeting growth in interrupting capacity by merely changing fuse capacity.

The DBA-5 is just one of a complete line of Westinghouse boric acid power fuses suitable for most applications where compact and economical short circuit protection is required.

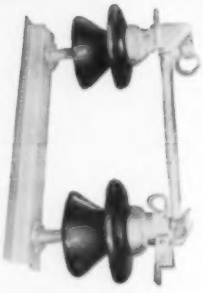
For complete information, get in touch with your Westinghouse Representative, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60873

YOU CAN BE SURE...IF IT'S Westinghouse

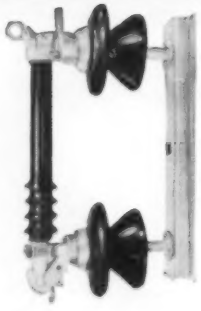
A complete line of DE-ION boric acid power fuses for all applications.



Type BAL
Current Limiting



Type DBA
Drop-out



Type BA
Vented and
Condenser

CP-1031

APJA

Appliance Parts Jobbers Assn. will try something quite new in its first annual Trade Show and Service Seminar at the Cosmopolitan Hotel, Denver, May 17-20. Ray Jones, a director from Denver, has brought the convention to Denver and arranged that it be both a workshop conference and a trade show. Another feature will be a visit to the Emily Griffith Opportunity School where an appliance servicemen's training program has been under way for more than a year. Subjects covered in the seminar sessions will be manufacturers' relations, advertising and publicity, service clinics, financing and cost of doing business. The trade show will offer opportunities to manufacturers of washing machine and appliance service parts to show new tools, equipment and gadgets. John R. Trible of Washington, D. C., is the national president. Besides Jones, another Western director is Howard F. Parker of Los Angeles.

CSA

Electrical contractors division of the Contractors Safety Assn. of Los Angeles held its second anniversary dinner April 19, hearing a talk on the grass-roots aspects of a contractor's business problems from A. H. Gudie, Biddle Trade Bureau. Late in the evening Howard Miller, business manager, returned from a meeting with the group representing various branches of the electrical business in regard to a portion of the proposed new city electrical code. The Contractors Safety Assn. protested the provision requiring that plans and specifications for jobs of certain kinds and sizes be prepared and signed by a registered electrical engineer. Despite compromises that he reported at this gathering, the group still did not consider the proposed revision satisfactory.

NISA

Ten technical and business subjects of interest to the motor repair shop industry will be presented at the 22nd annual convention of National Industrial Service Assn. at Hotel Statler June 6-9 in Los Angeles. These include harmonics in a-c motors, motor rebuilding standards, heremetics, fire prevention, group insurance, phase converters, reclassification of insulation grades, sales and the future of the business. Among the large list of speakers, Westerners listed are Earl S. Brooks, United Electric Motors, Seattle, on "Operation of Small Motor Shop," and Charles Sidway, Southern California Edison Co., on "AIEE Classification of Insulation Grades." Robert R. Gros, PG and E, San Francisco, will be the banquet speaker June 9. Program chairman is George Larsen of Larsen-Hogue Co., Los Angeles, and William M. Hogue, past president of the NISA, is general convention chairman.

Inspectors

International Association of Electrical Inspectors, Western chapters, had no regular schedule of meetings this year at which the IAEI secretary-treasurer or technical assistant attended. However, annual meetings were held by the Nevada Chapter at Ely April 23 and at Salt Lake City of the Utah Chapter on April 25. The Idaho Chapter held its annual meeting April 28 in Boise with Ralph Wickberg, state representative and member of the state electrical board, and Henry Faulkner, Westinghouse Supply Co., Boise, on the program and a code panel for the afternoon session, according to Don Baird, chairman of the Idaho Chapter. The Montana Chapter was scheduled to meet May 2 and 3 at Missoula in the Montana Power auditorium, according to Claude Angle, secretary-treasurer of the chapter. The usual joint meeting of three California chapters, Central California, Sacramento Valley and Northern California, will be held May 21 at Modesto. Next Puget Sound Chapter meeting is scheduled for Seattle June 3.

New Los Angeles Electric League president, Elwood Reeves, Magnavox, received gavel from Robert Williams, Brand Appliances, past president, at recent annual banquet

1955 Association Meetings Scheduled

May

9-11—**Northwest Electric Light & Power Assn. Business Development Section,** Salt Lake City.

11-13—**Pacific Coast Electrical Assn.** annual convention, Sheraton-Palace Hotel, San Francisco.

17-20—**Appliance Parts Jobbers Assn.,** home laundry service seminar and trade show, Cosmopolitan Hotel, Denver.

19-20—**Northwest Public Power Assn.** Engineering and Operating Section, Longview, Wash.

26-28—**National Electrical Contractors Assn.** annual District 6 and 8 conference, Sir Francis Drake Hotel, San Francisco.

June

6-10—**National Industrial Service Assn.** national convention, Hotel Statler, Los Angeles.

13-16—**Edison Electric Institute** national convention, Hotel Statler, Los Angeles.

22-24—**NWEL&PA, Accounting & Business Practice Section,** Hotel Vancouver, Vancouver, B. C.

27-29—**Canadian Electrical Assn.** national convention, Vancouver, B. C.

July

12-14—**Western Plant Maintenance and Engineering Conference** and show, Pan Pacific Auditorium, Los Angeles.

August

15-16—**American Institute of Electrical Engineers,** Hotel Finlen, Butte.

24-26—**Western Electronics Show and IRE Convention,** Civic Auditorium, San Francisco.

September

11-14—**Rocky Mountain Electrical League** annual convention, Grand Teton Hotel, Jackson Hole, Wyo.

12-14—**International Association of Electrical Inspectors, Northwestern Section,** Bellingham Hotel, Bellingham, Wash.

19-21—**International Association of Electrical Inspectors Southwestern Section** annual meeting, Mission Inn, Riverside.

26-28—**National Association of Electrical Distributors,** Empress Hotel, Victoria.

October

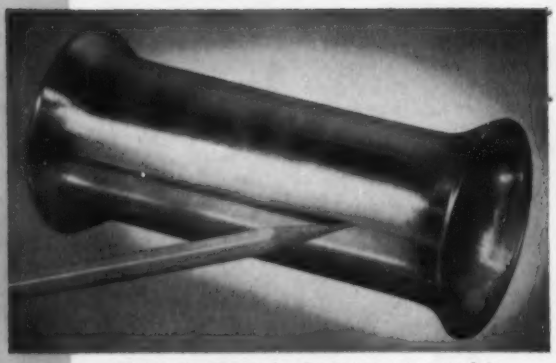
1-8—**Northern California Electrical Bureau,** Electrical Exposition, Oakland Civic Auditorium.

November

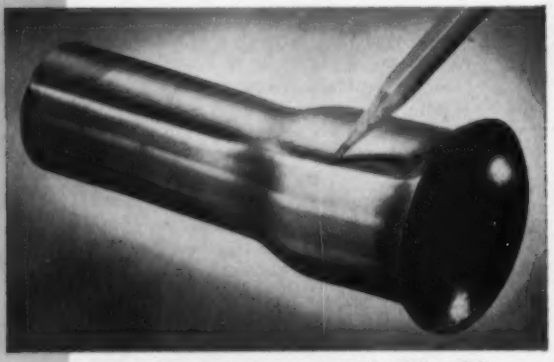
9-10—**PCEA-Hawaiian Section,** Honolulu.

These punishing tests

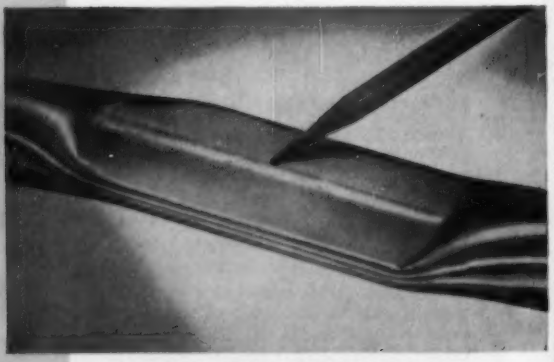
Available in 10-foot straight lengths, as well as 90° elbows. Sizes range from ½" to 6". Fully approved by Underwriters' Laboratories, Inc., Rome • RIGID meets all requirements for safe steel raceway . . . plus uniformly high quality. See your electrical wholesaler or call your nearest Rome Cable office today.



Thousands of pounds of pressure were used to flare this piece of Rome • RIGID like a trumpet at both ends. Yet, note how the weld remains firm.



Despite expanding more than 25%, followed by flaring, the weld here again remains as sturdy as ever.



Smashing blows like those of a drop hammer have flattened this piece of Rome • RIGID. Yet they could not disturb its powerful electric weld.

show why you get extra safety with Rome • RIGID steel conduit

The rigid conduit you install will never have to undergo tests any more severe than those put to these pieces of new Rome • RIGID.

Gruelling tests

Look at them. One has been flared like a trumpet at both ends. Another has been expanded more than 25%, then *flared*. Still another piece has been flattened by a force having the impact of a drop hammer.

Weld holds firm

Yet in all cases the weld holds firm. That is because Rome • RIGID is cold formed from shot blasted steel and electrically welded. In fact, it is the only rigid conduit in sizes ½" to 2" to be formed and welded in this way.

Advantages of electric welding

In addition to providing you with extra strength, the electric welding of Rome • RIGID also assures you uniformity of ductility, dimensions and concentricity.

Cleanest surface known

You'll find no oxidation and no scale on Rome • RIGID. The unique cold forming process eliminates these hazards often found with hot formed pipe.

Exceptional corrosion resistance

Perhaps, most important of all is the superior resistance to corrosion you get with Rome • RIGID. This is the only rigid steel conduit hot dip galvanized by Armco's patented Sendzimir process.

In this process the pipe is precisely heated, burning off all surface dirt, grease and scale. The surfaces are reduced to virgin metal, then cooled in the same atmosphere without ever coming in contact with the air.

The virgin clean surfaces are instantly coated with pure zinc inside and out. This uniform bond between bright, clean metal and molten zinc eliminates flux and assures years of safe, trouble-free service.

Easy to install

The Sendzimir process also provides uniformity of temper, plus easy fishing and pulling of wires.

Uniform diameters and careful threading assure simple connections, materially cutting installation time and costs.

Western Sales Offices:

Salt Lake City 1, Utah
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San Francisco 24, Calif.
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Denver 4, Colo.
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Los Angeles 22, Calif.
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It Costs Less to Buy the Best

ROME CABLE
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Economics of Planned Preventive Maintenance

Panel members, left to right: Charles F. Kimball, chief electrician, Ford Motor Co., Long Beach; Charles Kitchens, supervisor, electrical department, Anheuser-Busch Inc., Los Angeles; Clyde R. Garris, plant electrical engineer, Aluminum Co. of America, Los Angeles; and H. M. Eversz, plant engineer, McCulloch Motors Corp., Los Angeles, the chairman

Each represented a large plant operating complex and automatic machinery. Down time for repairs cannot be tolerated because it costs too much in production loss and labor idleness cost. Automation requires more skilled men to service complex equipment and requires a training program. Well organized program costs less than shutdown for repairs. It doesn't pay to make haywire temporary repairs either. Craft jurisdictions sometimes become a difficult problem to an over-all program.

Maintenance of Electrical Equipment in Industry

Panel members on platform: Chairman Robert E. Clauser, general foreman, electrical maintenance department, Union Oil Co., Los Angeles refinery; Charles C. Brandt, superintendent, electrical department, Bethlehem Pacific Coast Steel Corp., Los Angeles; Henry Schumacher, Richfield Oil Co.; and Walter A. Smoker, research department, Hughes Aircraft Co., Culver City, Calif.

This was a maintenance technique forum on measures, such as lubrication, inspection and testing used as preventive measures for motors, generators, transformers, switchgear, cranes, welders, etc. Special equipment for handling and for replacing or exchanging and replacing of parts and equipment to minimize interruption to production was described. After panel members had made a short preliminary opening, questions from the floor explored into many of the practical problems.

EMEA Holds Six-Ring Conference

With top talent from industry itself the Electrical Maintenance Engineers Association of Southern California gave 165 a choice of three of six parallel seminars on maintenance in a two-day conference, staged appropriately, in the classrooms at Founders Hall, University of Southern California, Los Angeles, April 6-7. The practical work sessions were preceded by a kickoff dinner at Rodger Young Auditorium, April 5, at which Howard F. McCullough, general manager of service shops department, General Electric Co., New York, was the keynote speaker.

A table-top exposition by 37 electrical manufacturers and distributors in an adjacent hall gave all an opportunity to see new materials and devices and took the place of the usual EMEA show.

John J. Singleton, EMEA president, made a plea for support of a proposed new Los Angeles Code that plans for installations over a certain size or type be signed by a state registered electrical engineer. Charles W. Doane, Larsen-Hogue Electric Co., general chairman of the conference, and his committeemen, Henry Bente on exhibits and Dan Slight on arrangements, ran a well-engineered program. A tour of the big Lever Bros. plant ended the affair after a brief talk at the closing luncheon by C. T. Atwood, plant manager.

McCullough **Singleton**

"Bucket brigade" approach to maintenance, putting out fires instead of preventing them, is outmoded, McCullough told the 335 who attended the dinner. Industry, he said, in its struggle to produce goods at the lowest cost is using more kwh per man-hour. More production means more automation, which means more maintenance and in turn more and better trained maintenance men.

He enumerated the four factors needed for maintenance management as a part of the management team—production rate responsibility, new equipment selection, control of materials and spare parts for maintenance and training of personnel. As mechanization decreases the number of production workers, more will be employed in maintenance.

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Special Instruments, Tools and Methods Used

Instruments and Panel Members John J. Singleton, mechanical supervisor, Lever Bros Co., chairman; Jerald E. Decker, senior electrical engineer, Northrop Aircraft Corp., Anaheim; Milton A. Brenner, Brenner-Fielder & Associates; R. Gubser, vice-president of engineering, California Consumers Corp.

Singleton prefaced by saying many are afraid to use instruments but if understood will find them useful tools. Brenner showed graphic charts to interpret how to find trouble, select equipment, check operation and compare against standards. Gubser showed simple test setups.

Maintenance of Electronic Equipment

Experience in this panel: A. H. Hatch, plant engineer, Container Corp. of America; K. Lee Alvey, maintenance electronic technician, Airesearch Mfg. Co.; Robert Marcum, general foreman, maintenance, department 20, Hughes Aircraft Co., chairman; and John C. Rapp, electrical engineer, Lockheed Aircraft Corp.

After describing electronic drives and their interlocking control systems, floor questions often brought up the scarcity of electricians trained for this field, the lag in school training as field practice advances so rapidly in industry, the need for plant training also.

Maintenance in Small Plants (Less Than 5 Electricians)

Open forum leaders were: Walter Heiman, vice-president, Tri-State Supply Corp., chairman, standing; Claude D. Clary, chief electrician, Pacific Wire Rope Co.; H. H. Eisenbrey, master mechanic, Pacific Tube Co.; Richard J. Smith, maintenance superintendent, E. K. Wood Lumber Co., southern division

Into this forum of practical ideas and methods for the small plant—with a range of topics from card files of records to neoprene coatings for stators—the relations with the plant management and purchasing department kept intruding. These human problems sometimes overshadowed the mechanical and electrical ones, for they affect the purchase of the right equipment rather than the cheapest bid, the recognition for the need for preventive inspection and test and regular scheduling.

Electrical and Safety Codes as They Affect Maintenance

State, city and county were represented: Arthur Veit, Los Angeles County chief inspector; Richard Rogers, owner, Ace Day & Night Electric Co., chairman; Edward V. Muller, California Division of Industrial Safety; and Arthur G. Clark, inspector and engineer, Los Angeles Department of Building & Safety

Orientation of the respective jurisdiction and differences between the state, county and city codes then led into questions on specific installation difficulties. The license examination for a maintenance electrician was described by Clark, the standards being high. Reasons for certain rules were explored. The distinction between minimum safety and well engineered adequacy was emphasized. The audience deplored the differences between the state safety orders and the National Electrical Code.

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Co-chairmen McNab, Liecty, Donald Hoover enjoy conference setting. Right, F. W. Mielke confers with Vic Hartley and E. D. Sherwin

Joint Group Continues Treasure Hunt for Net

At Phoenix meeting PCEA-PCGA sections study ways to cut record-keeping costs through increased efficiency

J. B. Thomas shows electric bill's 800-mile trip before delivery

Continuing its Treasure Hunt for Net, Pacific Coast Electrical Assn.'s Administrative Services Section met jointly with Pacific Coast Gas Assn.'s Accounting Section at the San Marcos Hotel in Chandler Ariz., April 6 and 7, to consider plant expenditures, purchasing, records management, land and rights-of-way.

Under leadership of James T. McNab, PCEA, and John L. Liecty, PCGA, both Arizona Public Service Co., co-chairmen, and F. W. Mielke Jr., Pacific Gas and Electric Co., vice-chairman, the sections have sought ways to hold down costs through increased efficiency at two other meetings this year. Building maintenance, pay roll accounting, credit and collections and stores were studied at San Francisco and a seminar on electronic data processing was held at Los Angeles.

More than 130 registered for the Phoenix conference, for which Arizona Public Service Co. was host. The group met together to hear luncheon speakers Wednesday and Thursday and at the cocktail party given by Arizona PS; spent the rest of the conference time in hard-working parallel sessions. Hospitality and setting provided entertainment after working hours.

Luncheon Programs

Nothing could be further from the truth than that utilities have no incentive to save net because they are regulated, Roy N. Dreiman, PCEA president, said in a short luncheon talk. One quarter of every dollar the business-managed companies receive from their customers goes for taxes, he pointed out, and they must practice the most rigid economies if they are going to meet the challenge presented.

PCEA Pres. Dreiman, Host Henry Sargent

Stating that he was glad to see new faces at the conference because "you young fellows have a job to do," PCGA's President E. D. Sherwin pointed to the advantages of talking around the table and finding out that all companies have problems. "You go home feeling that your company isn't as bad as you thought it was before you attended the conference," he reminded.

Pointing out that the electric industry grew out of the imagination of men, J. B. Thomas, president and general manager, Texas Electric Service Co., Fort Worth, called young people lucky to be in a business where there is a place to grow and use imagination and skill.

He told of the challenge committee of young people in his own organization, made up of design, operating, mechanical and plant efficiency personnel. The committee's job is to ask why—why each piece of equipment is made the way it is and why it is there at all. By just asking why, the company has cut more than $65,000 off every

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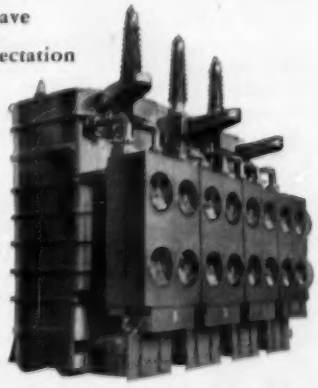

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Discussion section sponsors: Haven C. Smith, Arthur W. Holt, R. C. Witter Jr., T. J. Frost

new generating unit, he said.

The industry is in for at least 10 years of marvelous growth if it knows how to market the new things and take advantage of what it knows, Thomas believes. There will be ups and downs and bad years, he says, but he is optimistic about the long pull.

Asking whether in record keeping we have learned to get the most per man, he cited figures showing a 150% increase in production, with a 50% increase in the number of workmen producing things. Clerical employees, he said, have increased 150%.

Where public relations are poor, Thomas puts the blame on two things: (1) The wrong kind of people are representing us; (2) we failed to consider the importance of Mrs. Jones in our operating processes.

As an illustration he compared milk and utility billing procedures. The milkman, he said, is a friendly contact, he keeps track of the milk he leaves Mrs. Jones and gives her a bill at the end of the month. Mrs. Jones' utility bill, however, must travel 800 miles between the time the meter is read and the bill is delivered.

"You can get load factor and anything else you want off a milk bill," he declared. "You better get the transaction back between Mrs. Jones and our representative. You young men have more to lose than I if you leave this messed up."

Some of the things utilities are doing to tell their stories to the public were brought out by Donald D. Hoover, president of Bozell & Jacobs, New York, a public relations counsel for both gas and electric companies.

The electric industry is conducting an ideological fight against encroachment and is doing everything possible to hold back or turn the tide of socialization, he pointed out. The gas industry is looking more to the economic side at present but will be hit more as time goes on by the attempt to socialize.

Joined in this attempt is a hard core of honest, sincere people, who are spurred on by promoters, he believes. And local people are powerful in control of votes in this issue. The local public relations job is being done very well by the electric companies, he said.

While the gas industry has no common problem, the electric industry has a threat and is organized to meet it. A look at the record shows that marked progress has been made. There is an improvement in public attitude toward private business, he said, but industry is going to have to continue the fight. The employee is the best ambassador for his company, he declared.

Speaking briefly on the PIP program to inform editors and writers about what the industry is doing, he urged employees to let their public relations people and management know when they have ideas for stories. "You are in public relations whether you like it or not," he said in conclusion, "and you can contribute more if you think 'how can I help my company tell its story?' "

Sponsors and their secretaries acted as reporters for the section meetings. It is regretted that only excerpts from their excellent summaries can be given here.

Plant Expenditures

R. C. Witter Jr., So. Counties Gas, Sponsor

Touching on almost every phase of the subject, round-table discussions indicated that the eight companies represented employ quite varied methods. In opening discussion, Witter reiterated the conference objective: "getting the 'mostest for the leastest!' "

Led by M. L. Schmidt, So. Calif. Edison, the first discussion, **Cost Control — Contract Work,** was broken down into three main topics: Contracts—Cost Plus vs Lump Sum, Procedure for Assignment of Contracts to Outside Contractors and Procedure for Auditing Cost Plus Contracts.

For the lump sum contract, price determined by competitive bids, these advantages were noted: (1) Provides basis upon which cost is as nearly guaranteed as possible; (2) more efficient performance under the contract because it is to the contractor's advantage to operate as economically and efficiently as possible; (3) eliminates auditing of contractor's books; (4) simplifies manner of calculating payment.

Items constituting the cost portion of the "Cost Plus" contract were defined and importance of establishment of proper controls with regard to such items was stressed.

During the discussion it was brought out that many companies are leaning away from contract work except on major construction; the majority are getting away from cost plus contracts; most are turning to unit price basis rather than percentage of labor cost basis in cost plus contracts; some companies are contracting engineering work on major projects as well as actual construction.

Importance of prequalification of contractors invited to bid as to their skill, integrity and responsibility was stressed in discussing the second phase —procedure for assignment of contracts to outside contractors. Suggestions were offered for making such an investigation.

It was emphasized that each contract job requires company representation in the field and that job cost control is of great importance. Procedure for auditing cost plus contracts for work performed by outside contractors was presented.

Comparison of Plant Costs and Budget Estimates, led by P. D. Kelly, So. Calif. Gas, introduced first the procedure for preparation of the plant budget, which included the following factors: (1) Continuing forecast of system expenditures; (2) consolidation of divisional estimates into master system budget; (3) preparation of work order authorizations and the distribution of the copies of such work authorizations; (4) summarization of all projects and compilation of figures of the accounting department for the actual budget.

Methods and procedures for revising both the budget and work authorizations were discussed. Kelly distributed copies of forms used by his company to illustrate the various points brought out in his discussion of the preparation and utilization of construction cost data.

Jack Hart, Arizona PS, led the discussion **Analysis and Completed Plant Costs,** first outlining the work done by the plant accounting section of his company in analysis and clearance of costs on completed jobs, assignment of accounts and proration of overhead. He distributed forms used as exhibits

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to his explanation of the various procedures in posting charges to each work authorization and the eventual transference of such charges to plant.

In a discussion of the "deficiency notice" used by Public Service as supplemental authority for over and under expenditures not covered by the work authorization, Hart stated that it carried the same level of management approval as the original and is therefore accepted by the company's public accountants as an amendment to the original work authorization. Use of this notice has resulted in more careful pricing, estimating and operation of a project, he said.

The various loads and general overhead are being allocated by Public Service at the time of closing the work authorization to plant.

R. B. Luce, PG and E, led a discussion of **Use of Standard or Average Cost for Certain Additions to or Retirements of Gas Plant.** Properties are broken down into two groups: (1) production, storage, transmission, distribution (other than average unit cost accounts) general plant; (2) (based on average unit costs) distribution mains and services, house meters and house regulators.

Procedure for Billing Costs to Governmental Agencies for Work Preformed by Utility was the final subject, presented by C. H. Conway, So. Counties Gas. He began with a brief history of his company's negotiations with the state, told of the Collier-Burns Act, the 1948 blanket agreement with the state covering uniform procedure and the 1953 agreement relating to the construction of freeways.

Also brought out in the discussion were type of cost data required on a negotiated price basis and actual cost basis and billing procedures, as well as actual cost vs unit cost.

Discussion showed that all were faced with the same problem and were looking for the best method of billing government agencies.

Purchasing

Arthur W. Holt, Arizona Public Service, Sponsor

Selecting and Training Buyer Personnel—Holt reminded the group that organization planning and execution can of necessity be no better than the capabilities of the people who are given the jobs of organizing, planning and executing. Need for care in selecting personnel and training them in the responsibilities of spending millions of dollars was emphasized. Do we establish job responsibilities and then pick the man to fit the job or do we pick a man, find out his capabilities and then try to fit the job to him? was asked.

Value of a purchasing department manual was recognized in the discussion of training buyers and a trade publication reading rack or file was encouraged. Knowledge of materials can be improved by keeping in close touch with engineering and operations and suppliers. It was brought out that universities offer extension courses in industrial purchasing and periodical case study and lecture seminars. It was pointed out that educational seminars sponsored by the American Management Assn. and the National Association of Purchasing Agents offer excellent material on management and buying.

In discussing rotating purchasing assignments among buyers, advantages seen were broadened knowledge of materials; intercepting a tendency toward complacency in habits and practices; developing buyers appreciation of the range of material values. Objection was possible loss of efficiency in switching to less familiar materials.

Purchasing Department Efficiency—Roy M. Taylor, So. Calif. Edison, pointed out that organizing the department to do its job effectively requires a competent staff whose duties are well integrated but do not overlap. It was pointed out that in addition to other duties, the department is looked to by management for current information on market supply conditions, price trends, effects of labor negotiations in various fields of production, foreign market demands and progressive purchasing practices. When the department is made up of one or two buyers, other departments tend to do their own shopping and thus duplicate the work.

Group discussion brought out that many companies use some form of coordinating activity between engineering, operations, purchasing and stores. Proper channeling of information from department head down was recognized as necessary.

Purchasing Procedures—Harold L. Moler, Tucson GEL&P, brought out that reducing the time lag in placing purchase orders is affected by the number of approvals required. Incomplete description often causes delay.

In the sales interview, it was pointed out, time is a common dominator both to salesman and buyer. By permitting the salesman to make his pitch first, the buyer may learn of a product he overlooked in trade magazines.

Increased use of specifications will help protect quality standards, it was stressed. Inspection agencies are being used by some companies but generally the engineering department makes the tests.

Purchasing Stationery and Printing—R. E. Coulter, Calif. Elec. Power, showed that printed items could be organized to effect a real saving. Duplication can be reduced by having new forms and changes approved by a committee representing various departments, it was pointed out, and details can be handled by a clerk experienced in design and printing. One company reported a saving of $7,597 during the past year by doing much of its own printing on various office duplicating machines.

Bruce Henderson Formula—Frank M. Greenhalgh, So. Counties Gas, presented the question "Is the formula applicable to utility purchasing procedures?" Discussion brought out that at least three companies represented were using it in purchasing and inventory control. Primary problems appeared to be establishing an accurate cost of owning and warehousing inventory stock, arriving at a fair cost of buying and restocking, determining protective quantities for ordering points and how much to order.

District Level Buying—J. P. Schaefer, PG and E, led discussion on authorizing buying at the district level. As outlined the system of decentralized purchasing would be monitored by use of a buyer's guide manual distributed to district offices. Invoice auditing would pick up errors and violations to be referred to central purchasing, which would handle contract negotiations, purchases involving large expenditures and high-level buying. Advantages were recognized in controlled decentralized buying in cases where centralized warehousing was not used and where district offices were located in centers offering suitable vendor warehouses.

Policies and Practices—In this discussion led by J. T. Montague, PG and E, it was brought out that management's influence would be most helpful in shaping purchasing policies to protect public relations, buying economy and dependable sources of supply. Management's influence would be felt also where trade reciprocity might encourage new industry within a company's operating territory. It was pointed out that in view of the procurement officer's knowledge of prices, markets, sources of supply and negotiating practices he is finally becoming a member of the "first team," along with the chief engineer, head of operations and sales manager. He controls the spending of a large slice of the operating revenue dollar and is a custodian of good will.

Influence of engineering and operations on purchasing was recognized in their responsibility to set up specifications for standard M&S items. But undue requirements could restrict purchasing in securing approved sources of supply, it was brought out.

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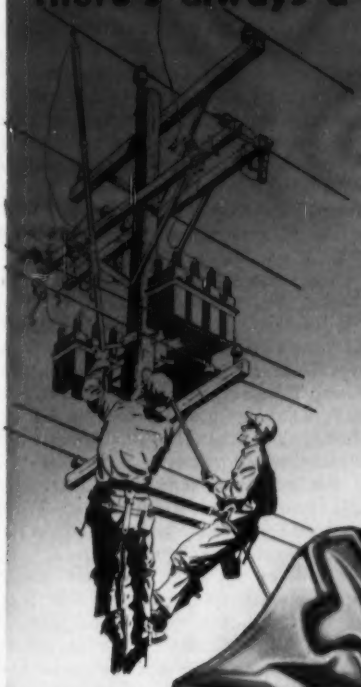

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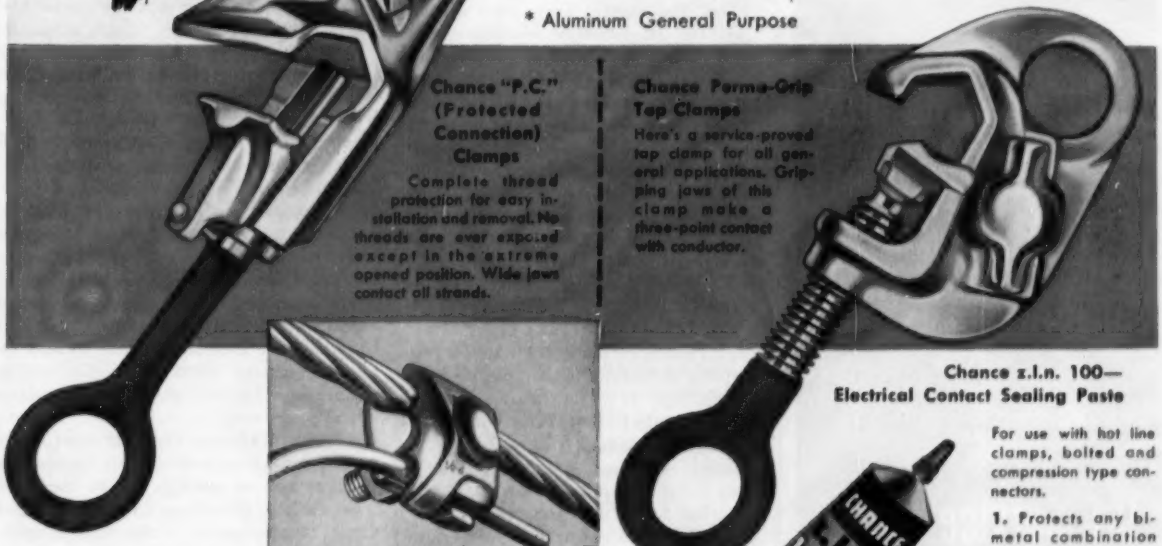

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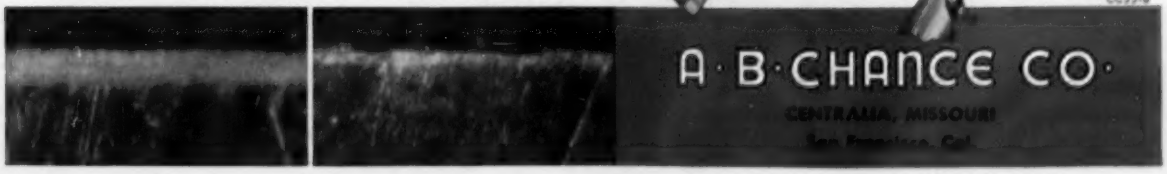

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In closing it was pointed out that the best purchasing job cannot always be measured by the statistics of prices obtained but by the net effect on the company's economy.

Records Management

Haven C. Smith, PG and E, Sponsor

Discussing briefly areas to be covered, Smith made these points: (1) Keep volume to a minimum by trying to eliminate records before they are created; (2) produce necessary forms, reports and correspondence at the least possible cost through use of forms design, paper-work simplification techniques, reports and correspondence controls; (3) release valuable office space and storerooms by transferring certain records to outlying areas; (4) eliminate need for new filing cabinets and reduce number already in use by transferring records to inexpensive boxes in storage areas; (5) store as many records as possible in a given area without jeopardizing instant reference and safety.

Merits of Records Management—Start first with the inventory and appraisal phase of the records management program, because it offers the best avenue for possible savings, advised Alan G. Negus, vice-president, National Records Management Council. It also affords opportunity to meet with department heads and other company officials to acquaint them with their records and to solicit their aid in establishing more realistic retention periods.

Reporting on typical studies and revisions made by the council on records-keeping installations, Negrus said that in one case 47% of the records were sold as waste paper, 26% were transferred to low-cost storage, 27% remained in office space. In another case, filing equipment purchases were canceled for from three to five years; 30% of the records were destroyed and half of those remaining were put in low-cost storage.

Experience has indicated that up to 97% of microfilming to save space can be discontinued, he said, because in most cases it is cheaper to house records in well-designed storage areas for the required retention period. It costs less than 33c per 1,000 documents per year to store records. It costs $48 per year to keep the contents of a four-drawer file in the average office, while it costs only $4 to store these same records in a storage center.

Negrus showed sample storage boxes, with cost range between 10c and 50c per box.

It has been found that an effective records-keeping program will yield a ratio of between one reference to 4 cu ft and one to 1 cu ft of records, he said. In some companies with storage centers as high as 90% of references are being handled by telephone. In general something less than 4% of records should be termed permanent.

Pointing to the appalling increase in clerical employees during the past 80 years, he said that in 1870 clerical was .63% of total employment; in 1950, 12.4%.

Subsequent discussions led by C. A. Leslie, Cascade Natural Gas Corp., E. J. Wright, San Diego G&E, E. A. O'Leary, Arizona PS, R. F. Brunken, So. Calif. Gas, W. T. Lisenby, So. Calif. Edison, M. R. Watson, PG and E, W. B. Grove, Arizona PS, and P. L. Abbott, Tucson GEL&P, brought out the following points:

Records Inventory and Appraisal—All records should be inventoried and recorded on an inventory and appraisal card showing descriptive record title, FPC item number, inclusive dates, approximate quantity in cubic feet, specific location and departmental origin (if necessary). The inventory should start in the storage areas and be extended to the office areas by department. Terminology should be clear. After inventory is completed, the legal and comparable company retention requirements should be indicated on each card. Cards can then be cleared for the necessary approvals of retention periods.

Creation of Retention Schedule—After retention periods have been approved, a schedule, preferably in manual instruction form, should be issued to all concerned with preservation and destruction of company records. When records are destroyed, date should be indicated on card. Periodic audits should be made to see that schedule is being followed.

Records Center Operation—Center should be designed to give maximum utilization of storage space (ratio of 3-4 cu ft of records to each square foot of storage space is considered adequate). Procedures should guarantee instant reference service and automatic disposition. Protection against fire, water, dust and vermin should be provided.

Microfilming—Some companies are microfilming vital records as protection against disaster. Most have not yet faced microfilming for storage. It was agreed that before doing so each company should make detailed cost study.

Filing Techniques—A filing manual is recommended to provide a uniform method that will give ready access to records. Segregation of routine short-lived papers at time of filing is an excellent practice. Duplicate copies of papers and correspondence also should

be segregated. Transfer of records to low-cost storage areas as reference diminishes is recommended.

Forms Design and Control—Clearance of all forms (new and for reprint) through a central control offers an excellent means of effecting economies in paper-work procedures. It also establishes necessity of new forms and prevents duplication.

Control of Reports and Correspondence—Screen all new reports to make sure they are not duplicating data already compiled. Analyze cost to see if report is justified. Be sure that no reports are continued merely to satisfy tradition or fill out a job. On correspondence route one copy to serve the purpose of several, keeping distribution to a minimum and eliminating duplication of files. Utilize form letters and correspondence guides to minimize cost of preparation.

Land and Rights-of-Way

T. J. Frost, Arizona Public Service, Sponsor

This sponsor conducted a lively session that held the interest of all who attended and induced a good deal of discussion. Unfortunately the report was received too late to print here and only subjects and speakers are given to show the topics covered.

Uniform vs Short Form Easements were discussed by O. I. Owens Jr., San Diego G&E, who also explained the customer extension department as it works for his company. This department is made up of men trained in right-of-way requirements, electric design and commercial fields, who keep in touch with construction, contact property owners and, after certain steps, secure a grant that gives the company certain rights and provides for a formal easement if later required.

Successful Negotiating Techniques, discussed by S. C. Thompson, So. Calif. Edison, brought out that the negotiator needs finesse, intelligence, perseverance and, most of all, knowledge of human nature.

Transmission Line Rights-of-Way Across Federal Lands was discussed by Harry Sturges Jr., legal counsel for So. Calif. Edison, who pointed out that the manner of securing the needed right-of-way was well defined by the acts of Congress for the particular area concerned.

Contracts With Our Highways, Our Legal Rights, Interim Billing were presented by Edward C. Ritchie, PG and E, who explained two major contracts with the Division of Highways under which his company operates. He also described its interim billing plan for sums of money due the state.

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THE MONTH IN BRIEF

BPA Industrials Get More Power

Although a Bonneville Power Administration curtailment order is not lifted, 14 industrial customers were receiving up to 95% of normal energy in late April, after being cut back to as low as 25%.

Budget Bureau Okay's Oregon Project

Partnership legislation for Cougar and Green Peter Dams in Oregon's Willamette Valley has been endorsed by the U. S. Bureau for the Budget as "in line with the administration's policy of encouraging partnership between federal and nonfederal agencies in the development of water resources." Eugene Water & Electric Board wants to develop the first, and Pacific Power & Light the second.

Eighth McNary Unit Turned On

Corps of Engineers turned unit No. 8 of McNary Dam on for the first time April 18, and it is now on the line and adding another 70,000 kw to capacity, making the total 600,000 kw, according to Col. A. H. Miller.

Box Canyon Project About Complete

Pend Oreille County (Wash.) Public Utility District commissioners expect all four generators at Box Canyon Dam on the Pend Oreille River to be operating by May 15. Each of the generators will produce 16,667 kw.

Merger Brings Lower Rates

Customers of Pacific Power & Light Co., in two districts absorbed in a merger with Mountain States Power Co., now have rates lowered a total amount of $302,000 annually. The same order, signed by Charles H. Heltzel, Oregon public utilities commissioner, provides for uniform rates in the coast districts of the company. Coos Bay and Willamette Valley divisions were the two affected.

SMUD Payment Plan Defeated

A bill allowing Sacramento Municipal District to make payments in lieu of taxes to local government agencies was defeated in California. Other public utilities, also exempt by law, feared pressure on them to do the same thing.

Co-ops Buy Generating Station

The Arkansas Valley Generating & Transmission Inc., an organization of three southern Colorado REA cooperatives, has agreed to pay Southern Colorado Power Co. $3,500,000 for a new generating station nearly completed at Canon City. The cooperatives will then lease the plant to the private company for 40 years. The 16,500-kw plant will be adequate for REA growth for the next 10 years. Lower interest rates and additional capacity are benefits to Southern Colorado Power Co., according to President David B. Hyer.

Co-ops and Utility Sign Contract

A contract calling for operation of a proposed REA generating station by Western Colorado Power Co. was signed in Montrose, Colo., April 28. The Colorado Ute Electric Assn., composed of four REA co-ops, plans to build a 25,300-kw steam plant and 129 miles of transmission lines with an REA loan of $7,925,000. The plant would be operated by Western Colorado Power, and the line would interconnect all five companies. Commented J. A. Bullock, vice-president of Western Colorado, "This is a good example of the administration's partnership plan in action, and will assure a continued supply of electricity for the growing Western Slope."

Westinghouse Gets The Dalles Contract

Westinghouse Electric Corp. has been awarded a contract to supply a switchboard for The Dalles main units one through eight and the fishwater units. The company's bid was $274,485, and completion time is July 1957.

Bond Issue Advertised

A $458,000 revenue bond issue to redeem outstanding bonded debt and save interest and funds for $110,000 capital investment in new transmission circuit, principally for industry, has been advertised by the Northern Wasco PUD for May 21. The transmission line would link The Dalles with Northern Wasco, Klickitat PUD and the Hood River REA cooperative systems.

PG and E Gets Kings River License

Pacific Gas and Electric Co. has been granted a 30-year license by the Federal Power Commission which allows construction of hydroelectric projects on the Kings River in Fresno County, Calif. Three new power houses and expansion of another would add 343,000 kw to the company's generating capacity for an estimated $80,000,000. The company had been granted conditional licenses in 1949 and 1951.

Utah Power Gets Permit for Service

The Utah Public Service Commission has granted Utah Power & Light Co. a certificate of convenience and necessity to build a line to the Monticello, Utah, uranium mining area. The proposed service was hotly contested by southwest Colorado REAs who claimed the territory, but they were not allowed to intervene because they are not public utilities under Utah law. Utah Power & Light had already been granted franchises by both San Juan County and the city of Monticello.

Hawaiian Electric Co.
Adds 50,000 kw
Plant to Oahu System

POWER IN THE PACIFIC

Visitors arriving at Honolulu see a new landmark on the skyline near the famous Aloha Tower. It is a beautiful modern building, housing a 50,000 kilowatt steam-electric generating station – latest addition to Hawaiian Electric Co. Ltd. facilities. As part of a well-planned program that looks to the future, the new plant has been designed for later expansion. Construction, by Hawaiian-Bechtel, was under the management of Hawaiian Dredging Company, Ltd. The plant was designed by Bechtel Corporation, with Merrill, Simms and Roehrig as consulting architect.

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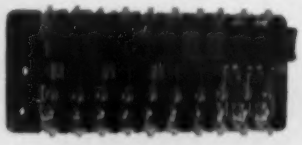

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THIS MONTH'S NEWS

POLITICS TAKE OVER AT HELLS CANYON HEARINGS

Four stormy hearings by the Senate Interior Committee on Hells Canyon legislation held in cities along the Snake River produced little but the conclusion that opinion about the dam is sharply divided, according to reports.

With pressure groups on both sides dominating most of the 20 hours of testimony and represented by about three-fourths of the 130 witnesses, the hearings resolved to an opportunity for both sides to air carefully prepared, oft-repeated arguments for and against high dams and pros and cons of private vs public development.

Purpose of the hearings was announced to be to tap grass-roots sentiment along the Snake River area that would be affected by the pending legislation. It was clear, however, that the hearings were mostly political battlegrounds with Republicans generally siding with Idaho Power Co.'s three-dam development and Democrats favoring government construction of a single high dam.

Meetings were held at Boise and Lewistown, Idaho, Pasco, Wash., and Portland, Ore.

So-called "grass roots" testimony was presented by Gov. Arthur B. Langlie, Washington, Gov. Paul Patterson, Oregon, Sen. Wayne Morse, Oregon, Sen. Henry Dworshak, Idaho, Ex-Sen. Clarence Dill, Washington, and Sen. Henry Copeland, Washington. At one point in the hearings Senator Dworshak accusingly stated that "the main purpose of the hearings was to provide a platform from which Senator Morse could launch his campaign for re-election. Certainly the information and light that has been shed on this controversial issue during these quickie hearings have been negligible. I maintain the chief beneficiary of the hearings was Senator Morse."

Completing First Engineering On Priest Rapids and Beverly

Three bond houses have indicated interest in marketing revenue bonds to finance Grant County PUD's partnership development of Priest Rapids and Beverly Dams, according to PUD Manager Glenn A. Smothers.

Smothers reported that preliminary engineering and diamond drilling are nearly completed. He said he has been informed the Corps of Engineers has $350,000 available for project planning, including studies of navigation and fish-passage facilities.

The PUD expects to apply for a FPC license for construction this summer, and to begin work in 1956 on Priest Rapids and 1958 at Beverly.

FPC Okays Fourth Generator For Seattle's Ross Station

The Federal Power Commission has authorized the city of Seattle, Wash., to install a fourth 90,000-kw-capacity generator at the Ross power plant on the Skagit River.

The plant as initially constructed contained three 90,000-kw units and provided space for a fourth.

Estimated cost of the additional installation is $5,333,900 and the city is planning completion by October 1956.

Power From Albeni Falls Dam Now Feeding Northwest Pool

Albeni Falls Dam on the Pend Oreille River in northwest Idaho is delivering power into the Northwest Power Pool, the Corps of Engineers has disclosed.

The first generator is rated at 14,200 kw, but low water level of the lake limited the maximum to 9,000 kw.

A second generator is scheduled to go on the line July 1 and the third and final unit Sept. 1.

• **Sterling, Colo.,** voters have given Public Service Co. of Colorado a 20-year continuance of its service franchise. With 58% of the registered voters casting ballots, the measure was approved by 94.7% of the 1,298 votes cast.

• **Franklin County PUD** of Pasco, Wash., has instituted new rate schedules, which incorporate average reductions of 8.4% to the PUD's 5,137 residential customers and 6.4% for 1,020 commercial customers.

• **A bill** which would have imposed a 3½% sales tax on customers of Washington utilities failed by a margin of one vote in the House of Representatives of the State Legislature.

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McGRAW-HILL PUBLICATIONS

KNIGHT WANTS CONTROL OF SAN LUIS PROJECT

Operation of the San Luis project by the State of California as part of the Feather River project, instead of integrating San Luis with the Central Valley project, has received the backing of Gov. Goodwin J. Knight.

He promised Sen. Thomas H. Kuchel he would appear in Washington, if necessary, to support a proposed amendment that provides for transfer of the San Luis unit to the state's Feather River project after the government completes the San Luis construction. The measure would also commit Trinity River power to financially aid the Feather River project.

Puget Sound Power & Light Considers More Steam Power

Puget Sound Power & Light Co. is considering extensive expansion of its Suffleton steam power plant near Seattle, according to L. E. Karrer, executive vice-president.

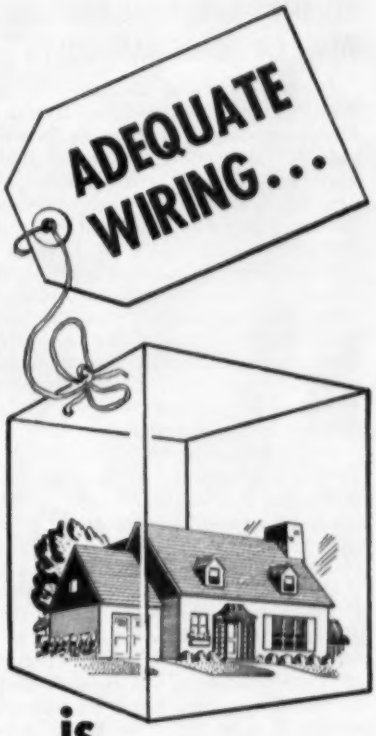
The low-water period on the Columbia inspired the company's expansion planning when Bonneville Power Administration was forced to curtail service to 14 industrial customers.

• **Salmon fishing** rights of the Yakima Indians of Washington at the site of The Dalles Dam will cost Uncle Sam $15,019,640. A contract between the U. S. and the Indians for this amount has been signed, and the money is chargeable against the dam and power house costs.

• **George Gee,** business agent of Vancouver local 213, IBEW, was expelled from the union for alleged communist activities, and was then fired by B. C. Electric Co. after union leaders informed the company Gee was no longer a member. The company and the union have an agreement whereby the company only employs union members in good standing.

• **The University of Washington** will begin work June 1 on a new venture in cooperative power system research with Seattle City Light. A major objective will be to extend the application of digital computers to power system problems.

• **Pacific Gas and Electric** Co. set another all-time high record for its property taxes with payment of $41,272,764 in various California counties, cities, school and special districts. The company is the largest single taxpayer in the state.



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UTILITIES OFFER TO PAY 90% OF JOHN DAY COSTS

Portland General Electric, Pacific Power & Light and Washington Water Power companies stand ready to provide $273,000,000 of the costs of John Day Dam on the Columbia River. A new bill submitted to Congress calls for local interest partnership on the 1,105,000-kw project.

While Rep. Sam Coon (R, Ore.), in whose district the lower Columbia River site is located, offered the new partnership proposal, executives of the three Pacific Northwest companies announced in Portland their willingness to put up 90% of the estimated $310,000,000 cost of the project.

PGE Board Chairman Thomas W. Delzell has said the companies "already had reached base" with financing houses, principally insurance companies, for any portion or all of the cost of the power phases of John Day.

Speaking for the three companies, Delzell said, "We can use all of the power ourselves, but are willing to accept partners. The bill is wide open—any agency can come in." He said other participants would have an assured source of energy in ratio to the percentage of financial participation, and at a definite cost.

The project would be wholly owned and operated by the United States.

Announcement of the plan was made jointly by Delzell, Kinsey M. Robinson, president of Washington Water Power, and Paul B. McKee, president of Pacific Power & Light.

Montana to Feed Power Pool With Frank Bird Steam Plant

Pacific Northwest states will receive about 100,000 kw of electricity from Montana Power Co., according to a report from George Scotten, Billings division manager of the utility.

The company is going to start up its Frank Bird 66,000-kw steam plant to help alleviate the present power shortage. The plant was completed in 1951 but was shut down when hydro plants were able to meet demands.

Public vs Private Skirmish Starts in British Columbia

British Columbia Electric Co.'s announcement in March that it planned a 132-kv transmission line to the up-coast pulp and paper town of Powell River has set off a public vs private power skirmish.

British Columbia Power Commission spokesmen say that until the announcement (made jointly with the Powell River Co.) the commission had assumed that the government's utility would install a line and take over the present company-owned industrial and domestic distributing system.

The decision will hinge on two factors: (1) whether B. C. Electric or the commission gets the contract to serve the big block of industrial power to Powell River Co.; (2) whether PUC will give B. C. Electric a "certificate of public necessity and convenience" to serve the area.

Dedication Program Planned At Lookout Point June 25

Dedication ceremonies for the Lookout Point flood control and power project on the Willamette River are set for Saturday, June 25.

The Honorable George H. Roderick, Assistant Secretary of the Army for Civil Affairs, is principal speaker.

The last generating unit of the project is expected to be completed May 26.

Education Program to Help Columbia Interstate Compact

Executive committeemen of the Columbia Interstate Compact Commission plan a two-year program to educate the public in seven Pacific Northwest states about the compact proposal.

The decision was reached at a Portland meeting that was the first of any commission group since model legislation to implement the Columbia Basin agency, which would have recommendatory power on all water resources developments, was submitted to the state legislatures.

States of Idaho, Utah and Nevada ratified the compact, but it was not introduced in Wyoming, died in the Washington House of Representatives and an Oregon legislative committee.

• **The city of Tacoma** is instituting court action against 65 owners of property in the vicinity of Centralia. A petition for eminent domain involves 40 properties amounting to about 2,200 acres. Acquisition of the land is necessary for Mayfield Dam on the Cowlitz River.

• **San Diego Gas & Electric Co.** has signed an agreement with local 465 of the International Brotherhood of Electrical Workers, AFL, providing for an average 3% wage increase. The contract was retroactive to Feb. 27 and extends to Feb. 27, 1957.

PNP WILL BUILD PROJECT IF U.S. DECLINES OFFER

Pacific Northwest Power Co., comprised of four utilities in the area, will undertake development of the north fork of the Clearwater River in Idaho alone, if a government partnership plan is not approved, according to Kinsey M. Robinson, president.

The development involves construction of the Bruces Eddy Dam for an estimated $117,500,000.

The proposal before the government now is for federal construction of the dam and Pacific Northwest Power construction of a 240,000-kw power station. The utility company would pay for falling water.

Western Industries Behind Big Atom-Powered Station

Two Western companies, Pacific Gas and Electric Co. and Bechtel Corp., both of San Francisco, are members of the Nuclear Power Group which is behind a proposal of Commonwealth Edison Co. of Chicago to build a 180,000-kw nuclear-powered generating station.

Other members of the group are American Gas & Electric Service Corp., New York, and Union Electric Co., St. Louis.

The proposal of the nuclear power group schedules completion of the plant for 1960, according to information from the Atomic Energy Commission.

The group's proposal also asks that the federal government assume public liability and property damage in excess of $500,000, unless insurance is available at a reasonable cost.

Yellowtail Partnership Plan Considered by Two Companies

Pacific Power & Light Co. and Montana Power Co. are conferring on possible partnership development with the federal government on the Yellowtail hydroelectric project on the Big Horn River.

PP&L President Paul B. McKee has confirmed reports that Under-Secretary of the Interior Clarence A. Davis has asked the two utilities to signify their willingness to participate in the $120,000,000 project to the extent of about $50,000,000.

"We want to participate and we will if the details can be worked out to everyone's satisfaction," declared McKee.

Congress authorized the project in 1944.

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PLAN SEPTEMBER LICENSE FOR SNAKE DEVELOPMENT

Pacific Northwest Power Co. will apply for a Federal Power Commission license to build Mountain Sheep and Pleasant Valley Dams by September, predicts Kinsey M. Robinson, president.

Total cost of the project, including transmission lines, is estimated at $200,000,000. It is reported that the two Snake River dams would produce 1,025,000 kw of energy.

The Pacific Northwest Power Co. is composed of the Washington Water Power, Portland General Electric, Pacific Power & Light and Montana Power companies. Engineering studies at the sites, including core drillings, are directed jointly by Bechtel Corp. and Ebasco Services Inc., and access roads have been built by the Morrison-Knudson Co. Part of the materials and supplies for engineering camps comes over the roads and part by diesel-powered riverboats from Lewiston, Idaho.

Robinson said that more than $1,000,000 is being spent in preliminary engineering, part of which is taking place from two camps located near the dam sites. Surveys indicate the Mountain Sheep Dam will be 233 ft high and that Pleasant Valley will be 492 ft.

Bond Issue for Sale in June Will Help Finance Mayfield

The Tacoma, Wash., Department of Public Utilities will offer a $15,000,000 revenue bond issue for public sale in June, to finance early stages of its Cowlitz River power development, Director Dean Barline has announced.

Revenue from the bonds will be used on the $45,000,000 Mayfield Dam, first of two to be constructed. More revenue bonds for $30,000,000 will be issued as needed. The second dam, Mossyrock, will be financed after Mayfield is in service.

Edison Company Seeks Permit To Issue $40,000,000 Stocks

Southern California Edison Co., Los Angeles, has applied to the State PUC for authorization to issue and sell a $40,000,000 convertible debenture issue.

Included in the application was a request to exclude the stock issue from competitive bidding by offering rights to holders of preferred and common stock.

Terms of the issue would be set by Edison.

MOUNTAIN SHEEP SITE will support 233-ft dam producing 300,000 kw. This area on middle Snake is reached by boat from Lewiston, Idaho, and newly built access roads through U. S. forest lands. Some drilling at site has gone through 30 to 50 ft of water

Bids and Contracts

• The town of Petersburg, Alaska, has negotiated a $490,310 contract with **J. A. Troxell** of Bellevue, Wash., for construction of a hydroelectric dam, penstock and power house, after rejecting all bids it received in March for the project.

• European firms placed one, two, three in bidding on a contract to furnish three 103,300-kva transformers for Chief Joseph Dam on the Columbia River near Bridgeport, Wash. **English Electric** Co. was low at $470,965.

• **Lincoln Service** Co. of Frontier, Wyo., was authorized by the Wyoming Public Service Commission to construct a $1,470,000 electrical distribution system into the Upper Green Valley in western Wyoming. The project includes a 69-kv line from Frontier through the valley to a substation near Pinedale.

• **Midland Constructors** Inc., Huntington Park, Calif., was apparent low bidder at $138,772 for Bonneville Power Administration work on construction of 16 miles of the Gales Creek-Lee's Camp section of the 115,000-v Forest Grove-Tillamook transmission line. The contractor has 110 calendar days to complete the work, which is a part of a new line BPA has scheduled to energize November 1955 to meet growing loads of Pacific Power & Light and the Tillamook PUD on the Oregon coast.

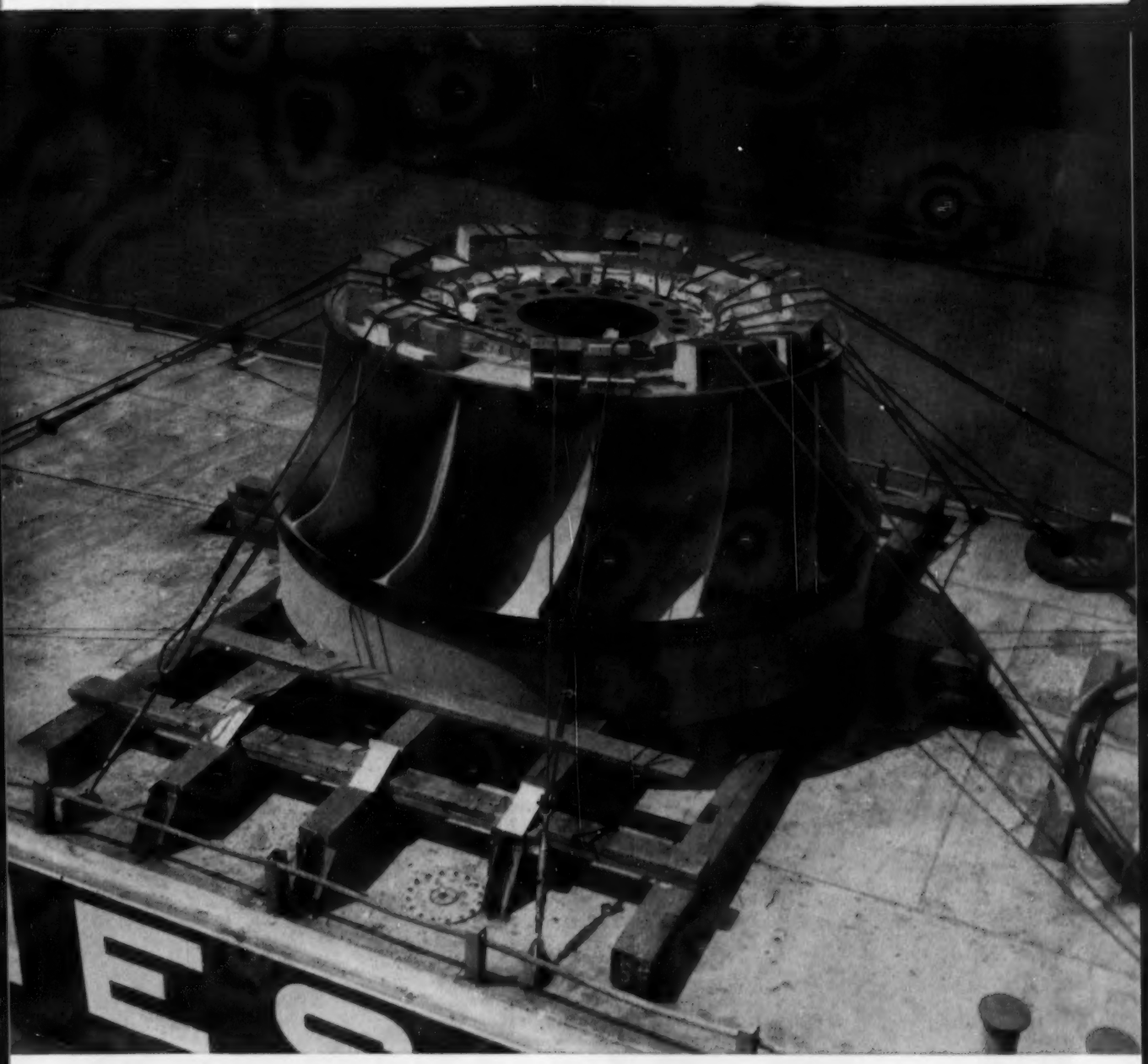
• A contract for boring a 6¼-mile tunnel for Pacific Gas and Electric Co.'s Poe hydroelectric project on the Feather River was awarded to the **Utah Construction** Co. and **Bates & Rogers Construction** Corp. The tunnel will be 24 ft in diameter.

• **Pennsylvania Transformer** Co., Canonsburg, Pa., was low bidder to supply a 12,000-kva transformer bank for Bonneville Power Administration's substation at Mill Plain, Wash. Bid was $76,740.

• **Lembke, Clough & King,** Las Vegas, is building a new general office building for Southern Nevada Power Co. A drive-in payment window and canopy over the parking area are outstanding features. The building was designed by Welton Becket & Associates, Los Angeles.

• **H. Earl Parker** Inc., Marysville, Calif., was apparent low bidder for 23 miles of right-of-way clearing for Bonneville Power Adminstration's Big Eddy-Parksdale section of the 287-kv transmission line from Oregon City to near The Dalles Dam.

• **H. B. Neshim,** Seattle, was low bidder at $14,760 for a 6,000-kva substation for Bonneville Power Administration at Timber, which will serve West Oregon Electric Cooperative's expanded facilities. The co-op recently completed a 34,000-v transmission line from Timber to Vernonia and another from Timber to Elsie.



173,000 lb. "GULLIVER"... largest Francis type runners ever cast in one piece

Baldwin's three hydraulic turbine runners for the Garrison hydroelectric plant are the largest of their kind in the world. 18½ feet in diameter, 9 feet high and 173,000 pounds in weight, they are the largest Francis type runners ever cast in one piece. Maximum horsepower rating is 134,000, limited by a generator loading of 115%.

Because of their size, these runners had to be shipped by inland waterways from Baldwin's Eddystone Division plant near Philadelphia. The photo shows the first runner being readied for shipment to the Corps of Engineers, U.S. Army, flood control and power generating project. It was transported on this barge up the Hudson River to the Erie Canal and across the Great Lakes to Superior, Wisconsin. A special railway car built by Baldwin carried it the rest of the way to Garrison Dam on the Missouri River near Riverdale, North Dakota.

A new bulletin on Baldwin and Pelton hydraulic turbine developments has just been printed. If you'd like a copy, please write to Dept. 5253, Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa.

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NEWS ABOUT PEOPLE

Sutherland and Gerdes Promoted at PG and E

James B. Black, president of Pacific Gas and Electric Co., becomes chairman of the board of directors June 1 and will be succeeded as president by Norman R. Sutherland. Robert H. Gerdes becomes executive vice-president and general counsel.

At the time of the executive changes, Black will have been with PG and E and a predecessor company 43 years. He has been a director 25 years and president 20 years.

Sutherland started his career with the company 42 years ago as a gas-lamp lighter after school hours. He became commercial manager in 1923, San Francisco division manager in 1945 and vice-president in charge of sales in 1947. In 1948 Sutherland became vice-president and assistant general manager. He was made vice-president and general manager in 1950 and a director in 1952. He will be PG and E's seventh president since incorporation in 1905.

Lauerman Roe Watters

• **Several personnel changes** have been made in the engineering department of the Salt River Power District, reports T. M. Morong, chief engineer. **C. V. Watters,** assistant planning engineer, is now supervising engineer of the planning and statistical division; **E. J. Lauerman** is liaison engineer between the utility and Bechtel Corp. during planning and construction of a new 100,000-kw steam plant in the Glendale-Peoria area and **Freemont L. Roe** is now consulting engineer with services available to all departments.

Sutherland

Black

Three Advancements Follow Ross Thompson's Retirement

Transfers and promotions among Public Service Co. of New Mexico personnel, involving two division managers and a general superintendent, have been announced by D. W. Reeves, executive vice-president of the company.

Elmer L. Kaemper, who has been manager of the Belen division for a year, was transferred to Las Vegas division as manager. He succeeds **Ross Thompson** who will retire June 1.

Robert B. Rountree, general superintendent of the Deming division for several years, will go to Belen as division manager replacing Kaemper. This change will be effective May 23. **Vernon Easley,** assistant electrical superintendent of the Albuquerque division, replaces Rountree as general superintendent at Deming.

• **Robert H. Short,** director of public relation and information for the Eugene, Ore., Water and Electric Board the past two years, has joined the public relations department of Portland General Electric Co. Short is a former Klamath Falls, Ore., newspaperman.

• **Cameron Ball** is new president and general manager of Western Merchandise Mart, San Francisco, succeeding **Frank K. Runyan** who has announced semiretirement. Runyan will continue on a part-time basis as management consultant and associate manager.

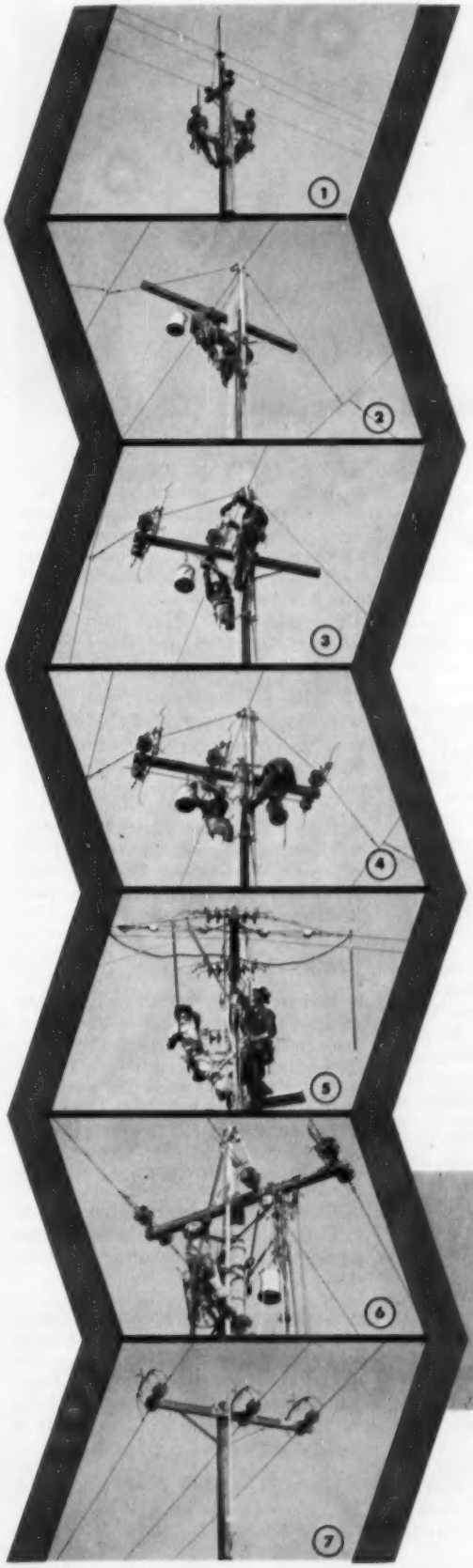
• Appointment of **Glen Coulson** as chief engineer of Moffett Engineering Co. has been announced. Coulson has more than 30 years of engineering experience in the design, manufacture and operations of materials handling equipment for mining, marine, manufacturing and atomic research fields.

• **Charles A. Scarlott,** former editor of *Westinghouse Engineer,* has joined the public relations department of Stanford Research Institute as manager of technical information services. He has been a chief editor in the engineering field for more than 20 years.

• **W. J. Smith,** who has been with the Puget Sound Power & Light Co. in Seattle for several years, has joined the Los Angeles staff of the Federal Pacific Electric Co. as apparatus engineer.

Montgomery

• **K. M. Montgomery,** former rate consultant for Ebasco Services Inc., has been named chief rate engineer of Pacific Power & Light Co. He had been with Ebasco 27 years, and was previously with General Electric Co. for two years after graduation from Dartmouth. Other rate department changes included appointments of **John Ford** to head of the contracts section and **Bjorn Gadeholt** head of the revenue budget and research sections. Ford succeeds **J. W. Plankinton,** who recently retired after 30 years' service.



22 KV HOT LINE SWITCH INSTALLATION

in less than 6 hours

A unique feature of KPF Air Break Switches is the ease with which they can be installed on hot lines. An important reason for this convenience is the simple design of KPF switches. They consist of two rigid dead end insulator assemblies with rigid jumpers forming the switch arms. One assembly is mounted stationary to the cross-arms. The other rotates to make and break the circuit. There are no complex parts to get out of order, require lubrication, adjustment or service. KPF switches serve indefinitely, are shipped ready for use requiring only bolting to the cross-arm and connection of conductors.

Pictures alongside illustrate a 22 kv hot line installation typical of those made regularly by leading power companies using KPF switches.

1. Line crew on job at 8:30 A.M. Gin pole installed and linemen start to untie and spread hot 22 kv line 3/0 copper. **2.** Line wires spread and new cross-arms installed for KPF switch. **3.** Switch being installed. **4.** Switch installed and adjusted ready to cut-in. **5.** Bypass jumper and blocks installed. Lineman about to deadend 3/0 copper into automatic deadend attached to KPF switch. **6.** Lineman lowering last conductor into position to be cut into switch. **7.** Switch complete and ready for operation. Time 3:10 P.M.

Get catalog, complete specifications, write direct

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AIR BREAK SWITCHES
Standard for nearly half a century

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Warren

Polhemus

Executive Changes Announced By Portland General Electric

James H. Polhemus, president of Portland General Electric Co. since 1940, retired April 30 after announcing his plans earlier at the annual stockholders' meeting. He was re-elected to the board of directors.

Executive head of the company now is Board Chairman Thomas W. Delzell and president is Frank M. Warren Jr., former executive vice-president.

Polhemus became associated with PGE in 1936 as executive vice-president. Prior to that time he was chief engineer and manager of the Port of Portland for 16 years. He is closely associated with Portland civic affairs including chairmanship of the Exposition-Recreation Commission, which is currently establishing facilities authorized by voters in 1954. Much of his time after retirement will be devoted to the $8,000,000 civic undertaking.

Delzell has had specific responsibility for rates, financial matters and policy relating to state and federal agencies since becoming board chairman in 1948. For nine years previous he was one of two independent trustees in the reorganization proceedings of Portland Electric Power Co. Before that time, Delzell was with the California Oregon Power Co., and served one year as the state's first assistant public utilities commissioner.

The new president joined PGE in 1937 and became a vice-president in 1942, the same year he entered Army service. Elected the executive vice-president in 1947, Warren has directed much of the engineering and operating detail. He is a graduate of Stanford University school of engineering and Harvard school of business administration. Warren has directed much of the detail of operating and engineering for the company.

• **William T. Nordeen** has been promoted from assistant manager to manager of the Douglas County PUD at Bridgeport, Wash., to replace Manager **Don Thompson,** who resigned. He has been managing the PUD's East Wenatchee office since 1950, after working first for Puget Sound Power & Light Co. and the Chelan County PUD.

• **R. M. Sensintaffar** of Casper, district power manager for the Bureau of Reclamation, was elected president of the Wyoming Engineering Society.

• **Elmer Titus,** construction superintendent for the Franklin County PUD of Pasco, Wash., since 1950, has been appointed manager of Ketchikan Public Utilities at Ketchikan, Alaska.

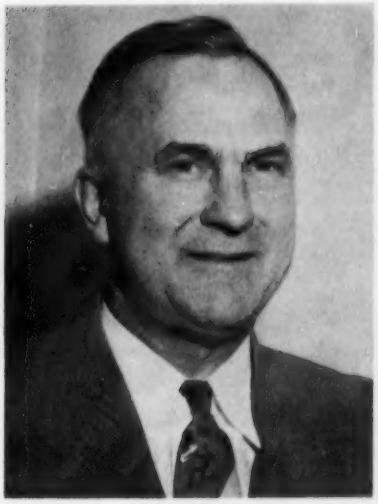
Deaths

• **Hubert Sharp,** 56, former chairman of the Colorado Section of the American Institute of Electrical Engineers, died at his Denver home April 16 after suffering a heart attack. He was chief radio engineer for the Mountain States Telephone & Telegraph Co. He received his engineering degree from the University of California in 1921.

• **Charles E. Riggs,** 60, founder of C. E. Riggs Electric Co., Portland, died April 3 at his home in suburban Beaverton, Ore.

• **Laurence V. Fickel,** 63, Denver electrical engineer, died April 3 after a prolonged illness. He received his electrical engineering degree from Kansas State College and attended the Westinghouse School of Engineering in Pittsburgh.

• **Harry W. Finnell Jr.,** Pacific Coast sales manager for Phelps Dodge Copper Products Co., died April 21 at Pasadena, Calif.



Morphey

New Power District of PP&L To Be Headed by Morphey

Pacific Power & Light Co. has named **L. A. Morphey,** veteran superintendent of power, to be in charge of an enlarged power district, which embraces all of the company's properties in the States of Washington and Oregon. The position carries the title of power section superintendent.

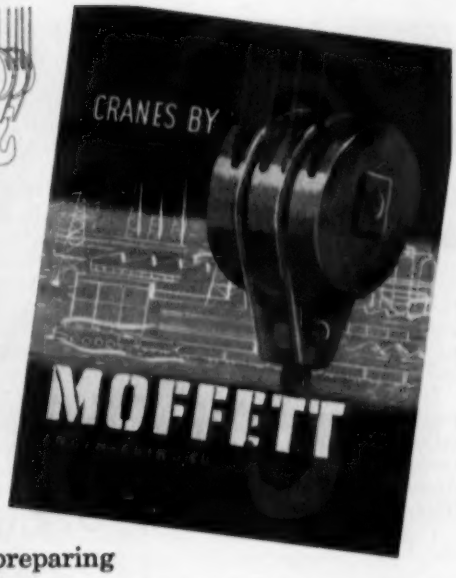
The announcement effects a changeover involving integration of all former Mountain States Power Co. properties in Oregon with those of PP&L and includes appointment of 14 other employees to new responsibilities, according to E. Robert de Luccia, vice-president and chief engineer.

George Nostrant, formerly chief load dispatcher, becomes assistant general superintendent under Supt. J. Coleman Jones. **E. L. Bayles** becomes supervisor for power scheduling section and will represent the company on the power pool operating committee and supervise operating relations with the intercompany pool.

• **Board Chairman Thomas W. Delzell** of Portland General Electric Co. is one of 17 officials of electric utilities invited by the Atomic Energy Commission to consult on licensing regulations and policies for nongovernment atomic development work. Delzell has been close to the problems being studied by PGE and other Pacific Northwest utilities under AEC contract.

• **Bonneville Power** Administration has named **Thomas E. Black** Portland area office manager and **Loron A. Moore** the Eugene district manager. Both have been acting in the same capacities since November.

Get this helpful booklet



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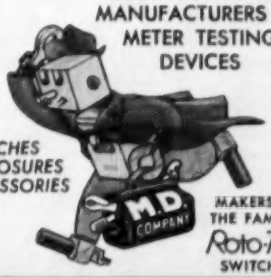

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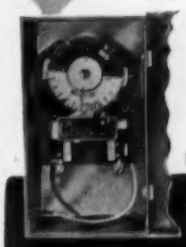

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NOTES ON THE TRADE

Construction to Begin Soon On American Brass Co. Plant

American Brass Co., a wholly owned subsidiary of Anaconda Copper Mining Co., plans to start construction soon on a new $13,000,000 brass mill in Los Angeles County, Calif.

The new mill will be built for the production of copper and copper-base alloys in the form of sheet, strip, rod, tubing and drawn copper products. Annual capacity is estimated at 30,000,000 lb.

C. Russell Epley, former San Francisco sales manager of the company, has been named manager of the new facility.

• **A new 35-mm color sound film,** Kilowatt Insurance, explaining the basic theories of transformer protection against lightning, short circuits and overloads, has been released by Allis-Chalmers Mfg. Co. Available from the company's General Machinery Division, Milwaukee 1, Wis.

• **O.Z. Electrical Mfg.** Co. of New York has opened a West Coast office, warehouse and light manufacturing operation at 501 Indiana St., San Francisco. The new facilities, with large stocks of the company's products, will enable the company to provide immediate service to all West Coast customers. Fittings and junction boxes requiring special manufacturing methods will be made at the new branch. **Adam Potralla** is in charge of the West Coast operation.

• **J. F. Ogden** has been named new consumer products manager of the Westinghouse Electric Supply Co. in Portland. His territory includes five counties in southwestern Washington and all of Oregon except three northeastern counties. His headquarters are at 815 N. W. 12th Ave., Portland.

• **Keeler White** Co. of Los Angeles and San Francisco has been appointed manufacturer's agent for the Diehl Mfg. Co., manufacturer of fans. Diehl is a subsidiary of the Singer Sewing Machine Co. Local stock will be available at both warehouses.

• **Robert B. Davison** has been appointed distributor sales manager of Cannon Electric Co., Los Angeles. Until recently he was sales manager for Pacific Electricord in Los Angeles.

• **Advanced degrees** in electronics engineering at Stanford University are available to outstanding electrical engineering graduates. Ampex Corp. and Stanford have instituted a work-study program that allows students to obtain an advanced degree while employed by Ampex. The company will pay the student on a 40-hour-week basis, contribute five of these hours toward class attendance and will permit students to correlate work and study schedules.

• **William P. Horn** Co., San Francisco manufacturers' representative, will now be known as W. & B. Stone Co., with headquarters remaining in the Western Merchandise Mart, 1355 Market St. The new name is representative of the two present partners in the firm, **Walter A. and Bernhard L. Stone.** It was originally founded in 1896 by the late William P. Horn.

• **Westinghouse Electric** Corp. has created a new Intermountain district for its Apparatus Division, with headquarters at 235 W. S. Temple St., Salt Lake City. **H. B. Hodgins,** local branch manager there since 1949, becomes manager of the new district. The new district embraces all of Utah, southern Idaho, most of Montana, western Wyoming and eastern Nevada.

• **Fairbanks, Morse** & Co. has appointed **John C. Elmburg** to the position of assistant general sales manager. Elmburg was formerly manager of the company's Portland branch. The appointment is effective July 1. Elmburg, in 26 years with the company, has served as technical assistant, field engineer, department manager and manager of the Boston, Atlanta and Portland divisions. **William F. Wahlenmaier** succeeds Elmburg in the Portland position.

• **David H. Holmes,** Seattle electrical engineer, has been appointed sales engineer for James I. Metcalf & Co. Inc., Seattle and Los Angeles manufacturers' representative. Holmes will handle sales and service engineering for English Electric products in 10 Western states and Alaska.

• **Porcelain Products** Inc. has selected Shaffer & Nelson, 312 Occidental Ave., Seattle, as its Washington territory representative. The Seattle firm is a branch of Shaffer & Nelson of Portland and will be headed by **Eric Nelson.**

• **General Controls** Co., Glendale, Calif., has named **Sumner Ladd** as manager of the company's industrial controls division. Ladd was formerly a salesman and then sales engineer for the company.

Buehler

• **John P. Buehler** has been appointed an executive engineer with the Bechtel Corp. He will be attached to the power division at San Francisco headquarters, assisting Vice-president John R. Kiely on special studies and assignments, particularly those of a hydroelectric nature. He retired with the rank of Colonel from the U. S. Corps of Engineers in February after 20 years of active service.

• **Muth-Richards** Co. has moved into its new building at 1804 Bush Place, Seattle. The company represents a number of electrical manufacturers in Washington, Oregon and Idaho.

• **The Curry** Co. of San Francisco now represents the Adalet Mfg. Co., Cleveland, Ohio. Warehouse stocks of the company's insulating bushings and couplings, service entrance caps, connectors and several other items are at 516 Townsend St., San Francisco.

• **John H. Ormand,** 2519 7th Ave., Oakland, has been appointed to represent the Standard Transformer Co. in southern Oregon, northern Nevada and northern California. He will handle the company's complete line of distribution, power, current, potential and metering transformers.

• **Frank A. Emmet** Co., manufacturers' representative of 2836 W. Pico Blvd., Los Angeles, has named **Wayne Woodruff** as industrial sales manager and **Elmer Watrous** to an assignment in the sales department. **Norman Theobold** is new jobber sales manager and **Ernest O. Snelgrove** is new executive secretary of the company.

• **Charles C. Allen** has been appointed as lighting engineer in Line Material Co.'s West Coast division. He is to work out of the company's Los Angeles office.

No Finer Apparatus Insulator!

It's VICTOR . . .

made of Purified Porcelain . . .

VICTOR
No. 729
STACKING UNIT
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With VICTOR "Know-How"

Correct design, quality-controlled manufacture, accurate jig assembly and *Purified* Porcelain make VICTOR Apparatus Insulators supreme in their field. These insulators give power men complete assurance because they combine maximum dielectric and mechanical strength. Each VICTOR Apparatus Insulator is individually tested at every point of manufacture. Each has to be precision-perfect before it is shipped. That's why these units are easier to install singly or in stacks, why they stand up better in service . . . why more and more power men are specifying VICTOR.

FEATURES

1. **MAXIMUM MECHANICAL STRENGTH** guarantees on-the-job dependability.
2. **PRECISION ASSEMBLY** assures perfect alignment . . . greatest possible stacking ease.
3. **MADE OF *PURIFIED* PORCELAIN** each insulator has unequaled uniformity of mechanical and electrical values, and resistance to thermal variations.
4. **THICK, RUGGED CORRUGATIONS** afford maximum resistance to impact . . . cut breakage costs.
5. **SCIENTIFICALLY COMPOUNDED CEMENT** assures high bond strength at all assembly joints.
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7. **SMOOTH, HARD GLAZE** assists self-cleaning process, reduces maintenance and replacement costs.
8. **RESILIENT COATINGS** at all cemented joints give maximum resistance to thermal variations and mechanical shocks or impact.

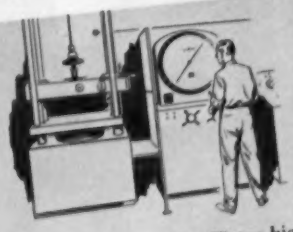
SPECIFICATIONS (SINGLE UNIT)

60 cycle dry flashover	160 KV
60 cycle wet flashover	95 KV
Pos. impulse flashover*	235 KV
Neg. impulse flashover*	290 KV
Withstand voltage 60 cycle dry	115 KV
Withstand voltage 60 cycle wet	75 KV
Withstand impulse voltage*	210 KV
Puncture	215 KV
Dry arcing distance	14¼"
Leakage distance	33"
Tension strength	20,000 lbs.
Torsion strength	40,000 lbs.
Compression strength	60,000 lbs.
Cantilever strength base mtd.	7000 lbs.
Cantilever strength cap mtd.	4000 lbs.
RNI	100 microvolts
1000 KC at applied	22 KV

*Crest KV. 1½ x 40 microsecond wave critical value.

For the full facts on Victor "Know-How," write for "The Story of Victor and Purified Porcelain." For engineering data on Victor Insulators, write for Bulletin No. 4.

NEWS FROM VICTOR



To take care of expanded test facilities, the Victor high voltage laboratory has been greatly enlarged and a new 120,000 pound Tinius-Olsen hydraulic testing machine (shown in drawing above) installed. This machine exerts a programmed load on a test piece while subjected to high voltage current. Tests are run to destruction either by mechanical or electrical failure.

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Low and High Voltage Pintypes • Suspensions • Guy Strains
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PROFILES

Moore

Meserve

H. L. Moore became general sales manager and J. C. Meserve, manager of residential sales, in recent staff changes announced by Southern California Edison Co. Moore's position is a new one in the organization. He had been manager of the right-of-way and land department since 1948

Miss Bradfield Miss Kruger

Ruth D. Kruger, home service director of Arizona Public Service Co., and Dorothy Bradfield, home service supervisor, discuss placement of the Laura McCall Award, which their department received at the recent Edison Electric Institute Convention

East and West met on the same panel at the South Pacific regional conference of IES at Los Angeles. On that program E. H. Salter, Electrical Testing Laboratories, New York, covered auxiliary equipment and John S. Walsh, PG and E, San Francisco, and Carlton M. Thompson, San Diego Gas & Electric Co., illustrated practical applications of lighting to merchandising, both in store interiors and the show windows

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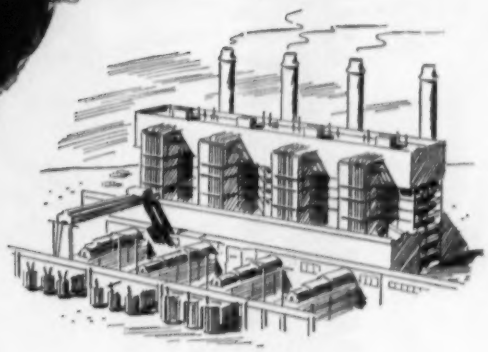

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The documented experience of others in your own field is available to your Shell Lubrication Specialist. He can analyze your entire operation from Shell's quarter-century backlog of experience...end expensive guesswork in *all* your lubrication problems. It will pay you to call him today!

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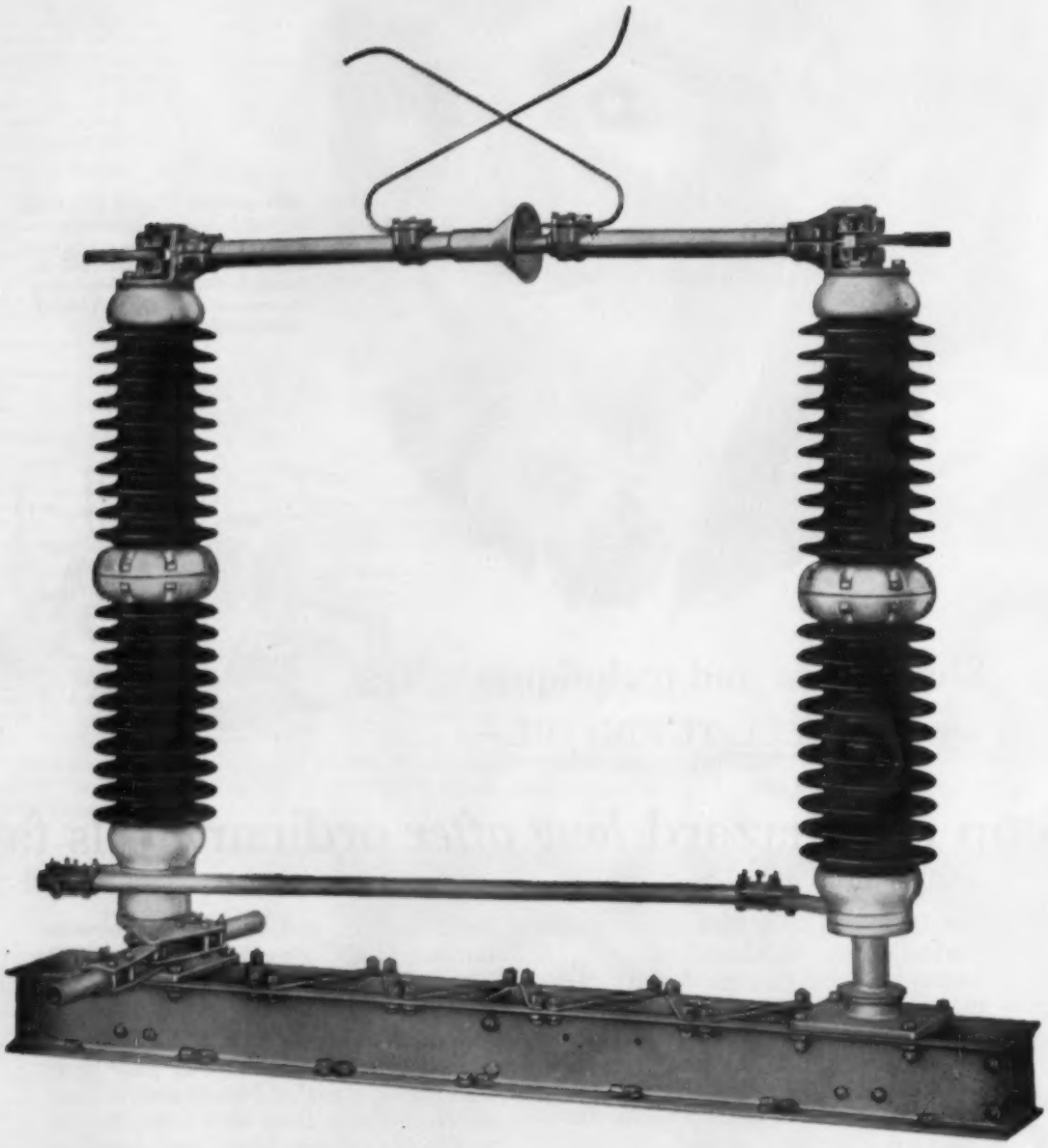

AIR BREAK DISCONNECTING SWITCH
115,000 Volts—600 Amperes—Type PU
Horizontal Mounting—Three Pole—Center Side Break—Group Operated
SILVER TO SILVER CONTACTS
One Pole Shown
See Bulletin 40A

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...electrical, of course!
What special event is coming up, for someone you especially want to please? Wedding? Birthday? Anniversary? Mother's Day? Here's the way to show your love—and your thoughtfulness! Choose a beautiful, usable electrical gift! No other present brings so much convenience, every day. And nothing else is a more constant reminder of you. Yet, these treasurable electrical gifts cost little to buy—and with P. G. and E.'s low rates for electricity, they're so inexpensive to operate. Next time you're gift-shopping, why not choose one of the wonderful electrical gifts at your appliance dealer's.
Electricity is cheap in California!
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COOL AS MINT
...the most comfortable summer you'll ever spend is yours, with a room air conditioner!
Refreshing, cool comfort . . . quiet and free from drafts. This is easy summertime living, with refrigerated room air conditioning in your home. Here at last is the way to relax, sleep, entertain, without heat or humidity. And today's room air conditioners even take pollen and dust out of the room. Modern room air conditioners cost less than most people think—and with P. G. and E.'s low rates for electricity, they're inexpensive to operate. See your appliance dealer now, about your new room air conditioner.
Electricity is cheap in California!
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This month, Northern and Central Californians will read these P. G. and E. promotional advertisements and when Californians buy and use more modern appliances, everyone profits . . . in business, in industry, in the home. For P. G. and E.'s low-cost gas and electricity can thus do more work, provide more of the comforts of life.

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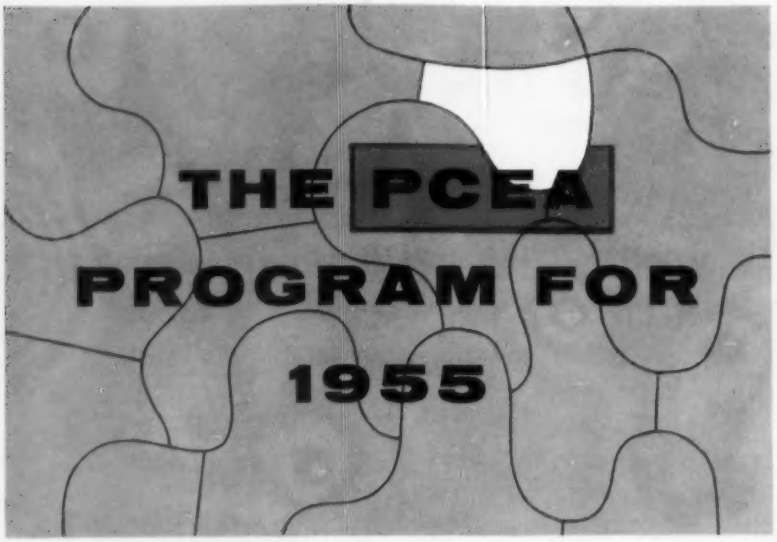
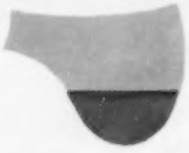
Gas and electricity are cheap in California





It takes your part, too...

to complete the picture!

Our P.C.E.A. program for 1955 is rolling right along. A busy schedule of activities is well under way. But it will be a *complete* program only if *you* take part in it, too. Achieving better days for the electric industry is our objective, and it requires the help of everyone in the industry.

If you aren't a member of P.C.E.A., we urge you to join. But that's not all. P.C.E.A. is not just for "joiners;" it's a "do something" organization with a definite and specific place for every man and woman. Whether you are a new member or one of long standing, we urge your active participation in those of our activities which best suit your interests and talents. You will be helping your industry—and you'll be helping yourself.

Contact either of our offices for full information.

Associations do those things which most people think just happen.

PACIFIC COAST ELECTRICAL ASSOCIATION

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